BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking to Consider Smart Grid Technologies Pursuant to Federal Legislation and on the Commission's own Motion to Actively Guide Policy in California's Development of a Smart Grid System.	Rulemaking 08-12-009 (Filed December 18, 2008)

SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) ANNUAL REPORT ON THE STATUS OF SMART GRID INVESTMENTS

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Dated: **October 1, 2012**

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In Ordering Paragraph 15 of Decision 10-06-047, the California Public Utilities Commission ordered Southern California Edison Company (SCE), Pacific Gas and Electric Company, and San Diego Gas & Electric Company to file annual reports in Rulemaking 08-12-009 on the status of their Smart Grid investments. SCE hereby files its annual report on the status of its Smart Grid investments for the period of July 1, 2011 to June 30, 2012. This is SCE's first annual report subsequent to requesting approval of its Smart Grid Deployment Plan (see Application 11-07-001).

Respectfully submitted,

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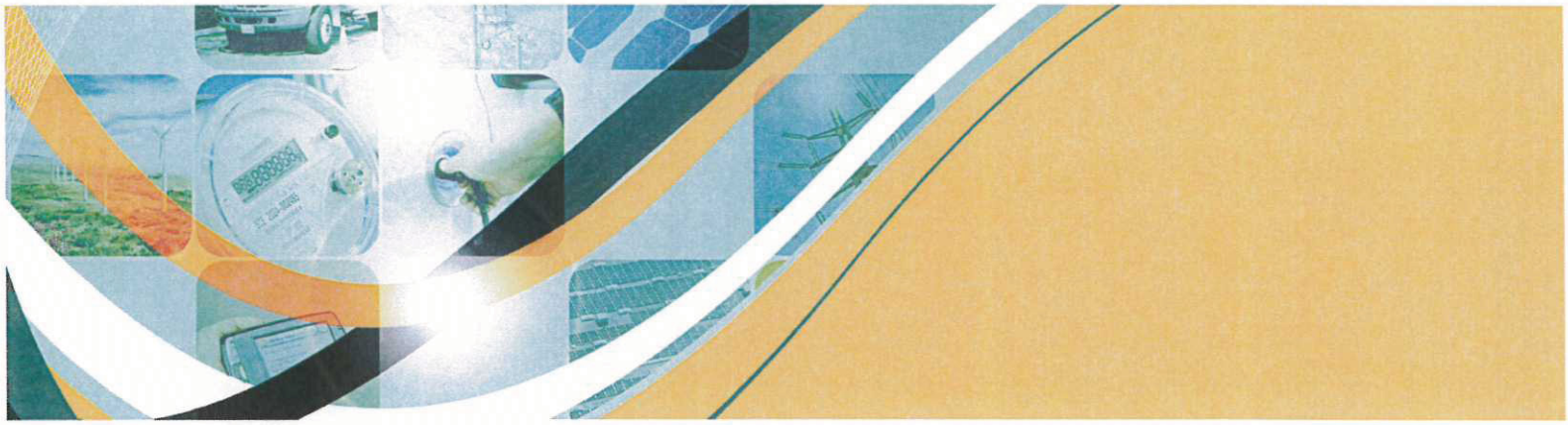
Annual Update - Smart Grid



October 1, 2012

SMART GRID DEPLOYMENT PLAN ANNUAL REPORT

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SMART GRID DEPLOYMENT PLAN ANNUAL REPORT

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I. Executive Summary

California's landmark Smart Grid legislation, Senate Bill (SB) 17, established that "[i]t is the policy of the state to modernize the state's electrical transmission and distribution system to maintain safe, reliable, efficient, and secure electrical service, with infrastructure that can meet future growth in demand and achieve" various goals aimed at a cleaner energy future, energy efficiency (EE), and more engaged customers.[1] SB 17 mandated that electric utilities submit smart grid deployment plans to the California Public Utilities Commission (CPUC or Commission) for approval. Southern California Edison Company (SCE) timely submitted its Smart Grid Deployment Plan on July 1, 2011.[2] The Commission has not yet issued a decision on approval of SCE's Smart Grid Deployment Plan.

SB 17 required that the Commission report annually to the Governor and the Legislature "on the commission's recommendations for a smart grid, the plans and deployment of smart grid technologies by the state's electrical corporations, and the costs and benefits to ratepayers."[3] In turn, the Commission ordered the California investor-owned electric utilities (IOUs) to provide an annual update on the status of their Smart Grid investments.[4] Each utility is directed to summarize the following: (1) deployment of Smart Grid technologies; (2) progress toward meeting the utility's Smart Grid Deployment Plan; (3) the costs and benefits to ratepayers; (4) current deployment and investment initiatives; (5) updates to security risk and privacy threat assessments; and (6) compliance with security rules, guidelines, and standards.[5] The updates cover the most recent period of July 1 through June 30. This report addresses Smart Grid investment from July 1, 2011 through June 30, 2012 (Reporting Period). Through this Smart Grid Deployment Plan Annual Report, SCE complies with its reporting obligation and assists the Commission in developing its annual report to the Governor and the Legislature.

SCE's progress in deploying Smart Grid technology during the Reporting Period was necessarily limited by the lack of a decision in SCE's Test Year 2012 General Rate Case (GRC). The Commission had not issued a proposed decision in SCE's GRC as of October 1, 2012.

The delay in issuance of a proposed decision in the GRC has caused substantial uncertainty. In the GRC, SCE proposed a number of foundational projects for its Smart Grid. SCE also proposed a series of pilot projects aimed at giving SCE the necessary information to plan broader advancements in a reasonable and informed fashion. These projects were described in detail in SCE's Deployment Plan. Absent a GRC decision, all of these various Smart Grid projects simply do not possess authorization or funding to proceed.

Similarly, SCE respectfully notes that the Commission did not issue decisions according to Commission-established deadlines in other Smart Grid-related proceedings, including the 21st Century Energy

[1] PUB. UTIL. CODE § 8360.
[2] *See* Application (A.) 11-07-001.
[3] PUB. UTIL. CODE § 8367.
[4] Decision (D.) 10-06-047, Ordering Paragraph 15.
[5] *Id.*

Systems Project application and the Energy Storage rulemaking.[6] Lastly, as noted above, the Commission has not issued a decision on SCE's Smart Grid Deployment Plan. SCE is therefore submitting this Update without the benefit of Commission resolution on its original plan.

Recognizing these factors, SCE maintained targeted and careful progress toward deploying a Smart Grid. At the Commission, SCE fully participated in rulemaking proceedings to develop energy storage policies, prepare the grid for electric vehicles, and establish funding for technology demonstration and deployment. SCE also advocated for the protection of customer data privacy and helped design consensus metrics to measure Smart Grid deployment and progress.

In the Smart Grid Deployment Plan, SCE described its deployment baseline and its vision for the Smart Grid. This Update details SCE's progress on specific projects. There are six types of projects:

Customer Empowerment. Customer empowerment projects provide customers with information regarding their energy usage. This information enables the capabilities of home area network (HAN) devices and facilitates dynamic pricing. These customer-oriented projects aim to provide information accessibility in the manner desired by customers and third-party service providers. SCE conducted various customer empowerment initiatives, including:

- The Edison SmartConnect Field Trials, which tested the functionality of smart meters; and
- The Summer Discount Plan Transition, which altered SCE's air conditioner load-control program to give customers the option of mitigating the potential inconveniences of curtailment events.

Distribution Automation and Reliability. Distribution automation and reliability (DAR) projects improve information and control capabilities for distribution systems. These projects focus on distribution challenges posed by distributed energy resources and clustered electric vehicle charging. DAR projects also mitigate outages by developing self-healing circuit technology. As part of DAR, SCE deployed assets for its Geographical Information System, which will provide a consolidated solution to manage safety, reliability, and compliance obligations.

Transmission Automation and Reliability. Transmission automation and reliability (TAR) projects address similar issues on the transmission system. These projects allow for the safe and reliable incorporation of utility-sized intermittent power generation such as solar and wind energy. TAR projects also enhance data collection and automation to prevent wide-scale blackouts. For example, SCE is designing a Centralized Remedial Action Scheme (CRAS) to address increased interconnection complexities.

Asset Management and Operation Efficiency. Asset management and operation efficiency projects improve the efficiency of grid operations. These projects identify infrastructure replacements based on asset health rather than time in service and prevent critical equipment failure. As an example, SCE successfully tested online monitoring of transformers at a 500 kilovolt substation.

[6] *See* A.11-07-008; R.10-12-007.

Security. Security projects address both physical and cybersecurity. These projects comprehensively address the increased security requirements associated with the development, implementation, operation, and management of Smart Grid systems and assets. SCE is developing security solutions and integrating them into its Smart Grid demonstration projects.

Integrated and Cross-Cutting Systems. Integrated and cross-cutting systems refer to projects that support multiple Smart Grid domains. An integrated approach creates a platform to deliver benefits across utility operations and to customers. Integrated systems also enable information sharing between the utility, service partners, and customers. SCE built its Advanced Technology Labs as an integrated environment to test the spectrum of Smart Grid projects, from renewable generation to substation automation to plug-in electric vehicles (PEVs).

These projects provide benefits to customers and third parties and help enhance the security of SCE's electric infrastructure. The Department of Energy's Office of Electricity Delivery and Energy Reliability (OE) developed a methodology to quantify Smart Grid benefits. SCE is developing a model, based on OE's methodology, that is tailored to its operating environment and that SCE anticipates will reasonably estimate the monetary value of SCE's Smart Grid investments.

The Smart Grid vision also brings risks and challenges. The electric grid has traditionally functioned based on physical mechanics. New technologies and requirements change the electric grid's system architecture to a computer systems-based model. This transition will be more cost-effective if the technologies are based on common standards. As SCE has maintained since Phase 1 of the Smart Grid OIR (R.08-12-009) four years ago, open standards are necessary to ensure interoperability and maximize market participation.

The increased reliance on automated systems also necessitates improvements in cybersecurity. SCE is working with the defense and intelligence communities to develop its Common Cybersecurity Services (CCS). CCS tailors solutions to specific devices, device classes, and locations. CCS is designed to satisfy various cybersecurity protocols, including the North American Electric Reliability Corporation's (NERC) Critical Infrastructure Protection (CIP) standards and the National Institute of Standards and Technology's (NIST) requirements.

The Smart Grid maximizes its potential when customers understand how they can use the new technology to increase efficiency and decrease costs. SCE proactively engages with and educates residential customers, business customers, governmental entities, and other stakeholders. Because the Smart Grid facilitates more interaction between customers and the utility, particularly through demand-side management, SCE adopted a new customer relationship approach. The new approach provides individualized program and service recommendations to customers.

This Update details how SCE engages customers to take advantage of its programs and services. During the Reporting Period, SCE deployed smart meters, informed customers about online tracking tools and services, developed an outage application for smart phones, enrolled customers in the Save Power Day program, and offered a time-of-use (TOU) rate for PEVs. SCE also provided marketing, education, and

outreach to its customers in regards to its Summer Discount Plan, web presentment tools, TOU rates, Budget Assistant, and Save Power Day programs.

In sum, for this Reporting Period, SCE continued to advance its Smart Grid initiatives in a reasonable manner, taking into account the uncertainties in funding for SCE's Smart Grid projects (as identified in the GRC discussion above) and the uncertainty in approval of SCE's original Smart Grid Deployment Plan. SCE looks forward to continuing to work in concert with the Commission, fellow utilities, and other parties to modernize the grid to deliver a cleaner energy supply from renewable and integrated distributed resources, and to empower customers to take greater control of their energy usage while improving reliability, safety, and cost-effectiveness.

II. Plan Update

2.1 Proceedings

SCE's progress in deploying and investing in Smart Grid technology partially depends on the pace of Commission proceedings. The most significant proceeding affecting Smart Grid efforts is SCE's 2012 GRC.[7] During the Reporting Period, SCE participated in GRC proceedings for a 2012 test year. The GRC provides SCE with the base funding and authorization to perform Smart Grid-related work. For example, through the GRC, SCE requested 2012 test-year funding of approximately $92 million[8] for its Advanced Technology organization. Although the Commission completed evidentiary hearings in August 2011 (with a single day for update testimony on November 3, 2011), the Commission did not issue a decision during the Reporting Period. In fact, as of October 1, 2012, the Commission had not released a proposed decision for SCE's 2012 test year. In the absence of a GRC final decision, SCE lacked the funding and authorization to engage in widespread Smart Grid deployment.

Similarly, the Commission did not approve SCE's Smart Grid Deployment Plan (SGDP) during the Reporting Period.[9] The purpose of the SGDP is to provide guidance and coordination for Smart Grid investments. It also enables the Commission to determine how well SCE is meeting the policy goals of SB 17. SCE filed its SGDP on July 1, 2011, and participated in workshops regarding the smart customer, smart market, and smart utility concepts. Despite anticipating a proposed decision in June 2012, the Commission did not issue a proposed decision during the Reporting Period. SCE is therefore submitting its SGDP Update without guidance from the Commission on its original plan.

SCE also did not receive an anticipated decision in its 21st Century Energy Systems Project (CES-21) application.[10] On July 18, 2011, SCE filed a joint application with Pacific Gas & Electric Company and San Diego Gas & Electric Company to recover the costs associated with a five-year cooperative research and development agreement with Lawrence Livermore National Laboratory. The CES-21 project will apply computationally based problem-solving resources to cybersecurity, electric resource planning, electric and gas operation, and workforce preparedness challenges. The scoping memo anticipated a proposed

[7] Application (A.) 10-11-15.
[8] In 2009 dollars.
[9] A.11-07-001.
[10] A.11-07-008.

decision in June 2012, but as of June 30, 2012 (the end of the Reporting Period), the Commission had not issued a proposed decision.

The Energy Storage rulemaking also missed its predicted decision date.[11] This rulemaking followed a legislative mandate to determine appropriate targets to procure viable and cost-effective energy storage systems. SCE participated in various workshops to develop overall policies and guidelines for energy storage systems. Although the scoping memo adopted a schedule providing for a final decision in the first half of 2012, the Commission did not issue a proposed decision by June 30, 2012.

SCE has prepared for plug-in hybrid electric vehicles and PEVs through the Alternative-Fueled Vehicle rulemaking.[12] This proceeding began a new compliance-oriented phase during the Reporting Period. The Commission issued a final decision on Phase 2 on July 25, 2011. On July 28, 2011, the Commission released a scoping memo requiring various workshops and compliance reports. SCE participated in a submetering protocol workshop, submitted a workshop report, and collaborated with stakeholders to develop a submetering protocol roadmap. In addition, SCE filed a joint utility report assessing the notification options to track the location of vehicle charging on the electric grid, the merits of each option, the projected costs of the options, and implementation scenarios.

The Commission opened a rulemaking on October 6, 2011 to establish the Electric Program Investment Charge (EPIC).[13] The EPIC program replaces the expired public goods charge and provides funding for applied research and development, technology demonstration and deployment, market support, and market facilitation of clean energy technology. As an EPIC program administrator, SCE attended a prehearing conference and workshop on establishing funding levels (Phase 1) and requested a workshop regarding the EPIC program's purposes and governance (Phase 2). At the close of the Reporting Period, SCE was planning workshops for its forthcoming investment plan.

SCE continues to actively participate in the Commission's Smart Grid rulemaking.[14] During the Reporting Period, SCE advocated for the protection of consumer data privacy and generally supported the Commission's adoption of metrics to measure Smart Grid deployment. As part of the data privacy effort, SCE filed an application to develop a platform that will allow automated access to customer data by authorized third parties.[15] This platform will enable third parties to develop automated products and services based on smart meter data.

At the Commission's direction, SCE filed an advice letter requesting approval of its Home Area Network (HAN) Implementation Plan.[16] The purpose of this filing was to give early adopters access to smart meter data in real-time via HAN devices. SCE began its HAN deployment with its Interim HAN Solution (IHS) in December 2011, three months prior to the Commission's required rollout date of March 2012. The Commission did not resolve SCE's HAN advice letter during the Reporting Period.

[11] Rulemaking (R.) 10-12-007.
[12] R.09-08-009.
[13] R.11-10-003.
[14] R.08-12-009.
[15] A.12-03-004.
[16] Advice 2662-E.

Also at the Commission's direction, SCE filed an advice letter requesting approval of its tariff modifications to provide price, usage, cost data to residential customers. [17] The purpose of this filing was to explain how SCE would provide price, cost, and usage data to residential customers online and updated on a daily basis. The filing also detailed how SCE would offer its residential customers bill-to-date, bill forecast, projected month-end tiered rate, and notifications as a customer crosses rate tiers. SCE was already providing the required information to its customers at the time it filed the Advice Letter. The Commission did not resolve SCE's Cost, Price, Usage Advice Letter during the Reporting Period.

SCE also submitted quarterly reports on its American Recovery and Reinvestment Act projects, the Irvine Smart Grid Demonstration (ISGD) and the Tehachapi Wind Energy Storage Project. ISGD tests the interoperability of Smart Grid elements from transmission to distribution to devices on customer premises. Specifically, ISGD demonstrates the use of synchrophasors, self-healing circuit technology, smart meters, HAN devices, photovoltaic solar panels, and energy storage devices, among others. During the Reporting Period, SCE negotiated contracts with vendors, signed up homeowners, tested and installed HAN devices, and deployed circuit technology.

The Tehachapi Wind Energy Storage Project evaluates the use of utility-scale lithium-ion battery technology to improve grid performance and integrate wind generation. During the Reporting Period, SCE worked with its subcontractors to design battery and inverter technology, executed a contract for substation construction, and worked with the California Independent System Operator on an interconnection study.

In addition, SCE recognizes Gov. Brown's Clean Energy Jobs Plan and its vision of building 12,000 megawatts of localized energy resources (LER). Although this target is not formalized in legislation or regulation, SCE is working to facilitate this goal. SCE studied the impact of LER on its transmission and distribution systems and shared the results with the Governor's office. SCE also streamlined the distribution interconnection process, presented webinars on interconnection issues, and partnered with governmental, academic, and industry stakeholders to study and advance LER technology.

At the federal level, the CIP standards developed by NERC and adopted by the Federal Energy Regulatory Commission (FERC) set a regulatory cybersecurity framework for protecting SCE's critical cyber assets. On April 19, 2012, FERC approved Version 4 of the CIP standards. SCE is designing its Sychrophasor Initiative to comply with the standards. In addition, SCE has expended significant efforts to achieve regulatory compliance in relation to existing critical assets.

As these varied proceedings illustrate, the Smart Grid is not a single concept, but rather the result of technological advances and policies throughout the electric system and the electric industry. SCE works diligently to study, test, deploy, and enable new technology. However, SCE's ability to identify and pursue new initiatives often depends on the regulatory process. Accordingly, SCE's efforts to pursue Smart Grid-related technologies and projects have been affected by delays in the regulatory proceedings described above.

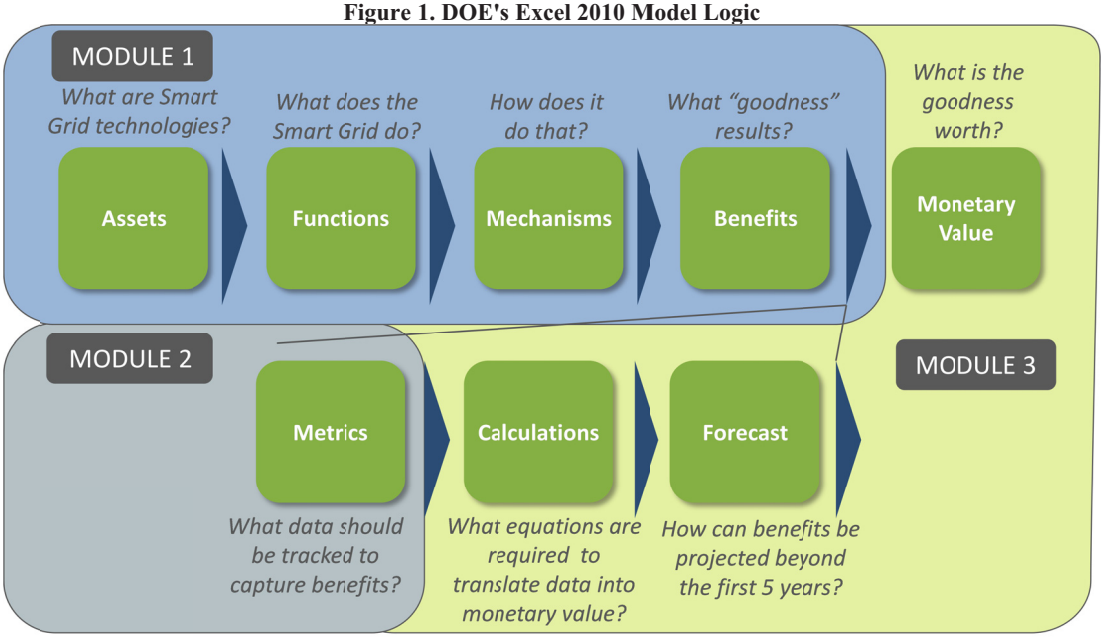
[17] Advice 2693-E.

2.2 Benefits

In this chapter, SCE provides a description of its benefits model. SCE is currently developing a model which applies a standardized methodology to value its potential Smart Grid investments. SCE's model leverages both the publicly available methodology from the U.S. Department of Energy (DOE) Office of Electricity Delivery and Energy Reliability (OE) and its Deployment Plan to support this development.

The OE is charged with leading national efforts to modernize the electric grid. OE, "along with utilities and other entities, are investing funds to demonstrate and deploy smart grid technologies and infrastructure through the American Recovery and Reinvestment Act (ARRA) Smart Grid Investment Grant (SGIG) program and Smart Grid Demonstration (SGD) program…. OE created a Smart Grid Cost-Benefit Analysis (CBA) team to develop a standard methodology for evaluating the performance, benefits, and costs of all smart grid field projects. To develop this approach, the CBA team defined a standardized set of smart grid assets, functions, and benefits as well as guidelines for providing data to OE so it can calculate associated benefits…. The functionality that smart grid assets and systems enable can be translated into monetary value based on the benefits they provide."[18] (See Figure 1).

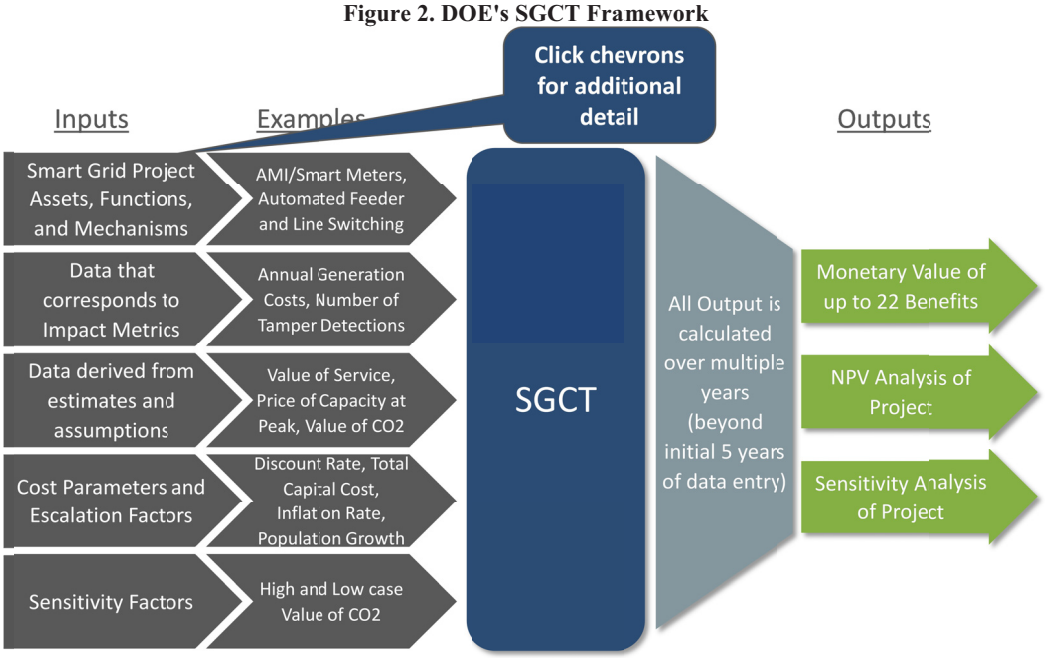
Figure 1. DOE's Excel 2010 Model Logic



"In order to facilitate such evaluation, Navigant Consulting, Inc. (Navigant) developed the Smart Grid Computational Tool (SGCT) based on the approach developed by the CBA team…. The SGCT is an Excel-based model that allows the user to identify the functions to be demonstrated by a smart grid project and to calculate the costs and benefits in order to estimate the project's overall value. The tool can be used to analyze real-world data or hypothetical scenarios."[19] (See Figure 2).

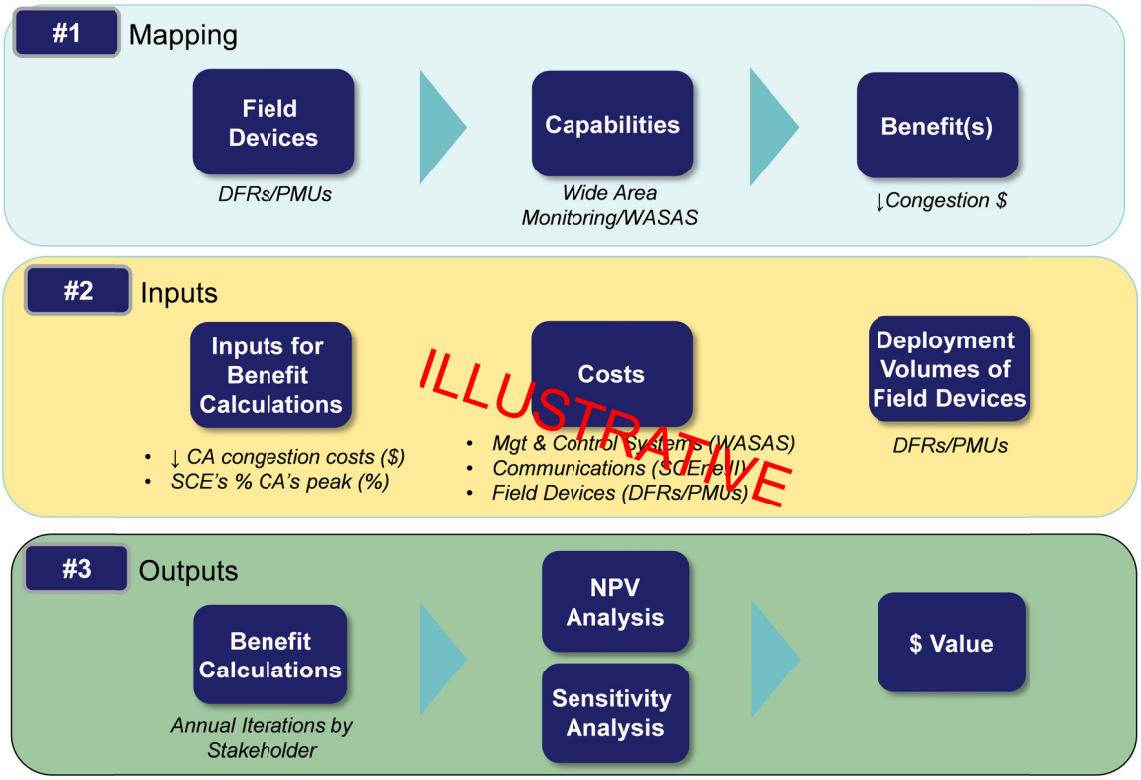
[18] http://www.smartgrid.gov/sites/default/files/pdfs/US_DOE_Smart_Grid_Computational_Tool_User_Guide_Version_2.0.pdf
[19] Id.

Figure 2. DOE's SGCT Framework



As noted previously, SCE is developing its own net present value analysis-based Excel 2010 model (Figure 3). This analysis-based model will be tailored to SCE's operating environment and professional judgment, but it follows DOE's overall methodology by mapping field devices to capabilities to benefits. It also adopts DOE's terminology and/or categorization where possible to enhance SCE's existing framework and provide a common context for discussion. SCE's model applies a standardized methodology to value SCE's potential Smart Grid investments over a given forecast period, recognizing that the model's methodology and initial results will change over time.

Figure 3. SCE's Excel 2010 Model Logic



Note: Costs would be applied across all the capabilities mapped to this field device. Not all field devices have clearly delineated management & control system and communication network costs.

III. Projects Update

In this section, SCE provides an update regarding its deployment projects and pilot projects described in its July 1, 2011 Smart Grid Deployment Plan. The projects have been grouped in six categories:

1. Customer Empowerment;
2. Distribution Automation;
3. Transmission Automation/Reliability;
4. Asset Management & Operational Efficiency;
5. Security; and
6. Integrated & Cross Cutting Systems.

A. Customer Empowerment

SCE's customer empowerment efforts support the Commission's Smart Grid vision which includes smart customers "who are informed about the Smart Grid and [are able] to use electricity more efficiently and save money."[20] In support of this vision, SCE's customer empowerment efforts will provide customers with accessible information regarding their energy information. As such, these projects result in customers gaining a better understanding of their energy consumption, both on an hourly and near real-

[20] Decision Adopting Requirements for Smart Grid Deployment Plans Pursuant to Senate Bill 17 (Padilla), Chapter 327, Statutes of 2009, June 24, 2010.

time basis. To empower customers, event notifications and price signals will be provided to customers and will be integrated into the HAN solution. Furthermore, SCE continues to develop rates and programs to encourage energy conservation and peak load reductions. SCE provides this energy information while protecting each customer's data privacy, in accordance with the Commission's decision adopting rules to protect the privacy of customer's electric usage data.[21]

Generally, projects in this area develop communication infrastructure, information systems, and energy management services, along with customer-facing tools, services, programs, dynamic rates and outreach capabilities. Furthermore, SCE's efforts will provide interval usage information to customer-authorized third parties.

The following discussion provides descriptions and updates regarding the customer empowerment projects. Throughout Section III, the dollar amounts associated with specific projects refer to the total amount spent from July 1, 2011 through June 30, 2012.

Energy Service Provider Interface	$0
Description: Pursuant to D.11-07-056, on March 5, 2012, SCE filed Application (A.) 12-03-004 proposing a technology platform and infrastructure to enable third parties, when authorized by a customer, to receive that customer's usage data in a secure, automated manner. SCE's proposal uses the data format from the Energy Service Provider Interface (ESPI) national Smart Grid standard (adopted by the North American Energy Standards Board in October 2011). This platform will support customer authentication and authorization, data exchange from SCE to a technically eligible third party, and customer or SCE revocation of authorization. Start/End Date: Implementation to begin 12 months after A.12-03-004 is approved. Funding Source: A.12-03-004	
Update: SCE's ESPI platform is pending Commission approval of A.12-03-004. During June 2012, parties in the consolidated proceeding for the IOUs' ESPI Application conducted informal discussions to try to resolve all open issues. In its Application, SCE assumed that the CPUC would issue a final decision on SCE's Application by the end of the third quarter of 2012, which would enable SCE to implement its ESPI platform 12 months later (i.e., by September 2013). Any delay in a final decision beyond September 2012 *may* result in a comparable delay in SCE's implementation date.	

Green Button Initiative	$105,000
Description: In September 2011, the White House challenged utilities to enable customers to download their usage data in a consistent format by clicking a "Green Button" on the utility's website. Start/End Date: Implemented Phase 1 in December 2011. Funding Source: A.07-07-026, A.07-11-011	
Update: SCE is implementing the Green Button capability in three phases. The first phase converted the	

[21] *See* D.11-07-056.

existing usage download button on SCE's MyAccount webpages to use the standard Green Button icon. Phase 2 will enhance the existing functionality by enabling customers to download historical interval usage data using a customer-defined time period (up to 13 months) and will give customers the choice to download data in spreadsheet (CSV) or extensible markup language (XML) format. Phase 3 will leverage the ESPI platform for Green Button Connect which could expand the ability to access energy information.

Edison SmartConnect Field Trials – Long Beach Field Trial	$0

Description: Through this pilot program, SCE installed two different in-home display devices in customer homes to learn how customers interact with the devices, how they value the information, and what features they feel are important to effectively manage their energy usage. The devices were deployed to 38 customer homes and customers completed surveys to provide feedback.

Start/End Date: October 2010 – April 2011

Funding Source: A.07-07-026

Update: The Long Beach field trial is complete and customers have provided feedback through surveys. Those responses have been evaluated internally and the results have informed subsequent device deployments.

Edison SmartConnect Field Trials – Interim HAN Solution Phase 1	$9,300,000

Description: The Interim HAN Solution (HIS) was a limited launch to 500 eligible residential, Edison SmartConnect, "program ready" customers. Eligible customers were invited by email and enrolled using a simple form on sce.com. Enrollment included enrollment in the Save Power Day Incentive Plus (PTR-ET) program, receiving a free SEP 1.0 in-home display device and the customer calling SCE to register the device. Registered HAN devices displayed near real-time energy information from the meter, daily bill-to-date, bill forecast and price and tier text messages and Save Power Day event notifications. This project implemented a new Advanced Load Control system for device registration, which will be leveraged in the future for HAN load control using programmable communicating thermostats.

Start/End Date: December 2011 – December 2012

Funding Source: A.07-07-026

Update: SCE exceeded the customer enrollment goal of 500 customers (532 enrolled by June 29, 2012) and completed deployment of HAN devices. SCE successfully registered over 400 HAN devices. SCE is currently following up with customers who have not yet called to connect their device to the Edison SmartConnect meter. SCE surveyed many of these customers. Overall, they found the enrollment process to be easy and the HAN devices provided meaningful information that influenced them to change their energy usage behavior. Customers who received HAN devices that could calculate near real-time cost had a higher satisfaction rate than customers who did not.

Edison SmartConnect Field Trials – HAN Real-time Cost Pilot (RTCP)	$10,000

Description: The RTCP, implemented pursuant to D.11-07-056, leveraged the HIS Phase 1 project. The only difference was that 250 of the 500 customers received a HAN device that was capable of calculating

near real-time cost using SCE's daily cost/price HAN test message. The purpose of the TRC project was to determine how SCE can convey cost information to customers and gain insight as to how customers value cost information relative to energy usage information.

Start/End Date: April 2012 – July 2014

Funding Source: A.07-07-026

Update: SCE deployed the RTCP devices to customers. The RTCP IHDs were deployed after the standard IHS devices. SCE has recently begun surveying the RTCP participating customers. Early feedback indicates higher customer satisfaction among customers with devices capable of displaying energy usage in terms of cost per hour.

Edison SmartConnect Field Trials – HAN Third Party Limited Launch	$0

Description: This pilot enables customers to purchase SCE-compatible HAN devices via a retail provider or service provider. The pilot includes the same features as the IHS Phase 1 project, including enrollment in Save Power Day Incentive Plus and daily cost/price messages sent to the HAN devices. SCE will evaluate customer experiences with SCE and third parties to adjust the processes and customer education materials appropriately for the next HAN project (HAN with Load Control).

Start/End Date: Fourth Quarter 2012 – First Quarter 2013

Funding Source: A.07-07-026

Update: SCE is leveraging the system functionality implemented in IHS Phase 1 for this project. Operational process development is nearly complete. SCE is in the process of testing the HAN devices that will be used for this project. SCE successfully partnered with two third parties and expects to launch this project in the fourth quarter of 2012.

Edison SmartConnect Field Trials – HAN with Load Control (LC)	$1,400,000

Description: HAN with LC involves upgrading systems and automating processes from IHS Phase 1 to enable self-registration of HAN devices via sce.com My Account. Customers will be able to purchase HAN devices through retailers and service providers and register the devices through the web. Customers who register a new HAN device will be eligible to receive a HAN device rebate ($25 for IHDs, dongles or gateways, $50 for PCTs and $75 for the installation). This project also includes a limited launch of 500 programmable communicating thermostats that will be provided by SCE and installed by an SCE contractor. Customers who chose to enroll will be enrolled in the Summer Discount Plan (SDP) program and customers will have the capability to override the load control event on the thermostat (depending on the SDP option they choose). This limited launch will enable SCE to evaluate the technology and processes before offering this option to a broad set of customers.

Start/End Date: Implementing December 2012; continue offering HAN with LC capability for the foreseeable future.

Funding Source: A.07-07-026

Update: System enhancements are in progress and system testing is planned to begin in September 2012 with a target implementation date of December 2012.

Advanced Load Control System and Enhancements	$0

Description: Development of Advanced Load Control System (ALCS) to provide basic HAN functionality and enhancements to ALCS including a second path from the ALCS to the HAN device through a customer's internet connection and addressing potential integration issues between the ALCS and SCE back office systems.

Start/End Date: 2012-2014

Funding Source: A.07-07-026 (basic functionality) and A.11-03-003 (enhancements). Costs for basic functionality are included in the Edison SmartConnect field trials described in this section.

Update: SCE anticipates implementing the ALCS to deliver load control management capabilities via ZigBee Smart Energy Profile (SEP) 1.1 by early December 2012. ALCS will be used to enable and manage a limited launch of 500 Programmable Communicating Thermostats (PCTs) in 2013. A related effort exploring a second path to communicate to HAN devices via Internet Protocol (IP) is dependent on the ratification of ZigBee SEP 2.0. SCE continues to be actively engaged with the ZigBee Alliance to complete the SEP 2.0 ratification process. SCE has started planning efforts for the next HAN project, which will explore enhancements to enable IP communication to HAN devices.

Home Area Network Support System	$0

Description: This project will implement enhancements and upgrades to basic HAN support functions, as well as the implementation of new system functionality. New capabilities include assistance with ongoing device utilization, understanding the customer's energy usage information and providing information and recommendations for improvement, and a more streamlined process for helping the customer troubleshoot their network.

Start/End Date: 2012-2014

Funding Source: A.10-11-015

Update: The HAN Support project is pending Commission approval of SCE's 2012 GRC.

Home Battery Pilot	$1,015,111

Description: Deploy residential energy storage units (RESUs) in up to 18 different customer locations to assess their performance in a variety of environments and applications.

Start/End Date: 2009-2013

Funding Source: A.11-03-003

Update: The Home Battery Pilot is split into two parts. About half of the Residential Energy Storage Units (RESU) will be tested as part of the Irvine Smart Grid Demonstration (ISGD) project and the other half will be tested outside of the ISGD project. The non-ISGD project is nearing the completion of the lab testing phase of all the units. LG, the battery manufacturer, is currently in the process of getting UL certification of these units with a target date of the end of September 2012. LG will then conduct field testing. For the RESU devices that are part of the ISGD project, SCE expects deployment by the second quarter of 2013.

Summer Discount Plan (SDP) Transition	$7,400,000

Description: SCE modified its residential Summer Discount Plan (SDP), an air conditioner load control cycling program, from a reliability-based DR program to a price-responsive program that offers customers the choice of override or cycling options to mitigate the potential inconvenience and discomfort of curtailment events.

Start/End Date: 2011-2014

Funding Source: A.10-06-017, A.11-03-003

Update: SCE has transitioned the residential SDP program to a price-responsive program. Most customers remained on the program and elected to provide the maximum load drop possible.
As of June 30, 2012, SCE had 300,894 customers enrolled in the SDP. Of this total, 274,190 customers elected to participate in the maximum savings option (100% cycling), 25,404 customers elected to participate in the maximum comfort option (50% cycling), 829 customers elected to participate in the maximum savings option with the override option, and 471 customers elected to participate in the maximum comfort option with the override option.

Smart Charging Plug-In Electric Vehicle Pilot	$0

Description: The Smart Charging Plug-In Electric Vehicle (PEV) Pilot investigates utilization of the utility's advanced metering infrastructure (AMI) to effectively manage plug-in vehicle loads. Through this pilot, SCE will explore DSM programs that aim to reduce overall system demand along with programs that decrease the impact of vehicle charging on distribution infrastructure such as transformers.

Start/End Date: 2012-2014

Funding Source: A.11-03-003

Update: SCE is awaiting approval of Advice Letter 2749-E to implement the Smart Charging PEV Pilot. Advice Letter 2749-E was filed on June 27, 2012.

Work Place Charging Plug-In Electric Vehicle Pilot	$0

Description: The Work Place Charging PEV Pilot deploys Electric Vehicle Service Equipment (EVSE) at SCE facilities to test, monitor, and analyze the impacts of PEV workplace charging. This pilot will test impacts

to building or facility electric supply systems and help to determine user preferences in pricing options and DR capabilities.

Start/End Date: 2012-2014

Funding Source: A.11-03-003

Update: SCE is awaiting approval of Advice Letter 2746-E to implement the Work Place Charging PEV Pilot. Advice Letter 2746-E was filed on June 22, 2012.

Metering Capital Requirements (2nd meter for PEV)	$0

Description: SCE plans to deploy approximately 24,000 additional AMI meters to accommodate customer adoption of time-variant PEV rates through 2014. These meters will leverage the AMI network and back office systems deployed as part of Edison SmartConnect to acquire and manage PEV load data.

Start/End Date: 2012-2014

Funding Source: A.10-11-015

Update: The Metering Capital Requirements for a second meter for PEVs is pending Commission approval of SCE's 2012 GRC. SCE currently offers EV customers three rate options. The majority of EV customers choose to remain on the Domestic schedule or select TOU-TEV. Neither of these options requires meter replacement as currently-installed smart meters accommodate these rates. Adoption rate for an EV1 second meter is low. Regardless of rate options, SCE finds that customers choose to charge their vehicles off-peak.

Dynamic Pricing System Modifications	$0

Description: SCE will modify existing systems to support the additional dynamic pricing rates and associated rate analysis and energy management tools. These new rates are required by D.09-08-028.

Start/End Date: 2012-2014

Funding Source: A.10-11-015

Update: The Dynamic Pricing project is pending Commission approval of SCE's 2012 GRC Phase 1 and Phase 2. SCE anticipates a final decision on its GRC Phase 1 application in the fourth quarter of 2012 and a final decision on its GRC Phase 2 Application in February 2013. SCE continues to develop the systems modifications required to enable the Dynamic Pricing Rates as well as the associated rate analysis and energy management tools.

Alerts and Notifications System	$0

Description: The Alerts and Notifications system will automate the delivery of important information to help customers manage their bill and payments, prepare for planned outages, and successfully adopt a smart energy lifestyle by taking advantage of dynamic pricing, DR, and EE programs.

Start/End Date: 2012-2014

Funding Source: A.10-11-015

Update: The Alerts and Notifications system is pending Commission approval of SCE's 2012 GRC.

Plug-In Electric Vehicle Support Systems	$0

Description: SCE plans to upgrade customer information systems in the 2012-2014 time period to support a more efficient and transparent process by which customers can enroll in dynamic rates for PEVs.

Start/End Date: 2012-2014

Funding Source: A.10-11-015

Update: The PEV Support Systems are pending Commission approval of SCE's 2012 GRC.

Subtractive Billing	$0

Description: Depending on utility requirements to support a PEV submetering protocol, SCE may upgrade customer service systems to support subtractive billing and device integration in the 2012-2014 time period.

Start/End Date: TBD

Funding Source: TBD

Update: The CPUC granted a one year extension to July 31, 2013 for protocol development for customer-owned sub meters requiring subtractive billing. While the protocol is in development, SCE is working with its Billing and IT organizations to develop cost estimates based on more detailed requirements. With the extension upgrades to the customer service system to support subtractive billing are likely to occur no earlier than 2015.

Demand Response Systems Enhancements	$0

Description: SCE owns and licenses a variety of systems used to dispatch and measure demand response events. These systems primarily consist of notification systems, load control dispatch systems, event status webpages, customer enrollment and reporting systems, and demand response bidding platforms. During the 2012-2014 funding cycle, SCE proposes various changes and enhancements to these systems to increase self-service, prepare for integration with the CAISO markets, and incorporate Edison SmartConnect-enabled programs.

Start/End Date: 2012-2014

Funding Source: A.11-03-003

Update: For the 2013 summer event season, SCE plans to (1) redesign the systems and processes related to the DR Aggregator Programs, Capacity Bidding Program & Demand Response Contracts, and (2) modify systems related to the Base Interruptible Program to allow dispatch by Abank Substation.

Ongoing Customer System Enhancements (Future GRCs)	$0
Description: Ongoing customer system enhancements were included in SCE's Smart Grid Deployment Plan as an indicator of future funding requests beyond 2014. SCE estimates future funding requests may range from $300 million to $750 million between 2015 and 2020. Start/End Date: TBD Funding Source: TBD	
Update: SCE has not updated its estimate for future funding requests for ongoing customer system enhancements beyond 2014. Such funding requests will be included in future GRC proceedings.	

Irvine Smart Grid Demonstration	$7,642,760
Description: The objective of SCE's ISGD project is to verify, quantify, and validate the feasibility of integrating Smart Grid technologies. This project will deploy various technologies that represent the future of an integrated electric distribution system which is expected to be more reliable, secure, economic, efficient, safe, and environmentally friendly than those in general use today. The project will showcase advanced technologies necessary to support a smarter, more robust electricity infrastructure that will be critical as the country begins to rely on greater amounts of renewable generation, to use electricity as a fuel for vehicles, and recruit consumers to become active participants in the energy supply chain. To accomplish these objectives, ISGD encompasses four key areas addressing a broad set of requirements: 1) energy smart customer devices, 2) year 2020 distribution system, 3) secure energy network, 4) workforce of the future. Start/End Date: TBD Funding Source: GRC, DOE	
Update: The ISGD project is in the late stages of planning, engineering and design and is making substantial progress in procurement. In the Energy Smart Customer Devices area, the project team has identified majority of vendors and plans to finalize more statement of works and contracts. A number of purchase orders are planned to be issued in the third quarter. In the area of Interoperability and Cybersecurity, SCE is preparing for the Critical Design Review, currently scheduled for late third quarter, and has established the list of design artifacts for this review.	

B. Distribution Automation/Reliability

Distribution Automation/Reliability (DAR) projects improve utilities' information and control capabilities for distribution systems. These capabilities may be used to address the complexities associated with

integrating distributed energy resources and electric vehicles, advanced outage management, and/or volt/VAR control. DAR projects provide the ability to safely and reliably incorporate high penetrations of distributed energy resources by mitigating voltage fluctuations resulting from intermittent power generation. These projects would also provide the ability to safely and reliably incorporate the increasing load of charging electric vehicles (EV). The incremental customer load from EV charging is expected to be clustered in specific distribution circuits of the power grid that are not currently designed to manage high levels of electric vehicle penetration.

DAR would detect and isolate faults when they occur, immediately restore service to customers as soon as possible and provide information to customers about outages in real-time. "Self-healing" circuits will reduce the number of customers affected by system disturbances and enable faster service restoration. DAR would also provide optimization of voltage and reactive power on the system to enhance power quality and decrease energy consumption.

DAR helps enable electricity markets to flourish and helps deliver a Smart Grid that has the infrastructure and policies necessary to enable and support the integration of demand response, energy efficiency, distributed generation and energy storage.

Transmission & Distribution Application System (Includes Geographic Information System and Geographic Information Application System)	$13,750,855
Description: The Geographical Information System project will consolidate the physical, electrical, and spatial features of all Transmission & Distribution assets and allow end-users to access this information from one reliable source. This comprehensive system will provide the ability to integrate multiple databases, both internal and external to Transmission & Distribution, and help meet safety, reliability, and compliance obligations. It will include detailed asset information, electrically linked information, and federal and local government information from such sources as the United States Geological Survey, the California Department of Forestry and Fire Protection, and weather services. This information will be used by other key SCE systems to gain operational effectiveness. Start/End Date: 2010-2014 Funding Source: GRC	
Update: SCE deployed the first phase of large transmission assets in December 2011. The vendor contract related to asset data conversions was signed on March 1, 2012. The purchase orders for the data vendors were completed during the second quarter 2012. Geographical Information System is in the process of finalizing the conversion strategy for the distribution, substation, and transmission data, which is anticipated to be completed by year end 2012. Work for Geographic Information System commenced on July 26, 2010 and is scheduled to be completed in the third quarter of 2014.	

Consolidated Mobile Solutions	$12,976,336
Description: Consolidated Mobile Solutions (CMS) will enable field personnel, system operators, and office workers to share real-time information related to software systems. The maps from these	

software systems will enhance SCE's safety, improve outage responsiveness, and contribute to SCE meeting its compliance obligations. CMS will reduce lost time, enabling the existing work force to be more productive.

Start/End Date: 2010-2013

Funding Source: GRC

Update: The performance testing activities were successfully completed in the fourth quarter of 2011. The second phase of analysis and design for system testing the pilot workgroup was completed in the second quarter of 2012. The configuration and integration for system testing within the pilot workgroup, and the migration to production environment is anticipated to be completed by third quarter of 2012. Training and deployment for selected pilot workgroups are anticipated to be completed by year end 2012. Work for CMS commenced on July 26, 2010 and is scheduled to sunset in the fourth quarter of 2013.

Distribution Management System (inclusive of COTS Software)	$5,706,451

Description: Distribution Management System (DMS) is the centralized computing system that allows SCE to gather data from various automated distribution devices and facilitates automated operation and control of the distribution system. DMS will replace SCE's current Distribution Control and Monitoring System, which is obsolete. DMS will provide an improved, comprehensive solution, intended for long-term use, to assist Grid Operations' System Operators in responding to routine and emergency field conditions.

Start/End Date: 2010-2013

Funding Source: GRC

Update: SCE successfully completed the first phase of replacement, design, configuration, and construction of the system. SCE also completed product testing in the fourth quarter of 2011 and successfully implemented the first phase of system development in April 2012. The Project Team is currently in the process of developing, designing, and configuring the second phase that relates to "Advanced Volt/Var Control" system by the second quarter of 2013. Final implementation of the Distribution Management System is planned to be completed by fourth quarter 2013. Work for Distribution Management System commenced on June 6, 2010 and is scheduled to be completed in the fourth quarter of 2013.

Integrated Smart Distribution	$0

Description: SCE's Integrated Smart Distribution program will have three main sub-projects. First, SCE will begin targeted roll-out of a new circuit design that will serve as the foundation of a self-healing distribution grid. This roll-out will help keep customers on-line and maintain system reliability.

The other two sub-projects will address issues that SCE anticipates will arise from increasing penetration of distributed energy resources, including intermittent resources like wind and solar. To address the

two-way power flows that SCE expects will result from deployment of these distributed resources, we will begin upgrading protective relays at our distribution substations. In addition, SCE will invest in large, distribution support devices (including energy storage) to accommodate the intermittent nature of electricity produced from distributed solar and wind generation. Together these technologies will form the core of a smart distribution grid that will improve system reliability and meet California's and the Commission's policy goals as defined in Senate Bill 17 and the Commission's Smart Grid OIR.

Start/End Date: TBD

Funding Source: GRC

Update: SCE has not completed any activities related to its Integrated Smart Distribution project during this reporting period. SCE will begin to start spending in 2014.

Circuit Automation	$2,000,000

Description: The primary purpose of SCE's Circuit Automation Program43 is to automatically restore power to customers after outages caused by faults. In providing this service, the Circuit Automation helps minimize the impact on customers of outages that occur in the ordinary course of business. The capabilities provided by the Circuit Automation Program are consistent with basic service provided by most utilities in this country.

Start/End Date: 2010-2014

Funding Source: GRC

Update: As part of the Automation program, SCE continuous deploying full programmable capacitor controls (PCC). Automating capacitor controls replaces failing capacitor controls while improving voltage and Volt-Ampere Reactive (VAR) control and adding capability for remote capacitor bank operating status and monitoring. During the 2011-2012 time frames, SCE installed on average, about 436 PCCs per year.

Capacitor Automation	$6,994,863.19

Description: SCE's Capacitor Automation program automates existing manual capacitor controls and upgrades obsolete, first-generation automation equipment. Capacitor controls are used to remotely operate switched capacitor banks installed on the distribution system to provide voltage and VAR support. Without capacitor banks, the voltage supplied to SCE customers would drop to levels that can damage the customers' equipment or appliances, and present safety hazards. Automating the control of these capacitor banks allows SCE to remotely monitor and control the operation of these devices, rather than sending a person to operate the device manually in the field.

Start/End Date: 2011-2016

Funding Source: GRC

Update: In order to maintain a reliable system, SCE has integrated remote control switches within its distribution system. Between June 30, 2011 and July 1, 2012, SCE installed about 215 remote control switches and had to spend $6,994,863.19.

SCE has recognized that automating distribution circuits can help improve overall system performance and increase the reliability of the system.

TBD – Distributed Energy Storage	$0

Description: This project will test and evaluate advanced electrochemical energy storage technologies (e.g. battery chemistries such as lithium-ion or sodium-metal halide and super capacitor technologies) in the laboratory for transportation and grid-connected applications. Energy storage is being integrated into passenger PEVs, light, medium and heavy duty hybridized trucks, and auxiliary power units for trucks. Stationary applications range from residential and small commercial, to community, distribution, and substation levels, and to large battery (or other energy storage) plants. SCE has and will continue to evaluate technologies for all of these applications in an effort to identify value and become familiar with technologies which will impact the grid in the near future.

Start/End Date: TBD

Funding Source: GRC

Update: SCE evaluated eight energy storage technologies for transportation and grid-connected applications. Additionally, SCE applied more than 4,500 battery test cycles and received $100,000 in in-kind contributions from manufactures. SCE published seven technology reports from evaluations of technologies with potential to impact the grid in the near future.

Outage Information	$0

Description: The Outage Information capital project takes advantage of existing capabilities of the Edison SmartConnect program to provide enhanced information about customer outages to SCE's service crews and dispatchers. As part of the program, information about the status and duration of outages at a specific customer location is now available through a process called load side voltage (LSV) check. The Outage Information program will build capabilities for personnel working with TDBU's Outage Management Systems; these personnel will be able to directly initiate these LSV checks.

Start/End Date: 2013-2014

Funding Source: GRC

Update: This project is scheduled to run from 2013 to 2014. The first draft of the "Outage Management Road Map" has been published.

Outage Management System	$0

Description: The Outage Management System (OMS) Project provides the business processes and supporting technology to effectively utilize new functionality provided by smart meters and the associated communications infrastructure. This project is compatible with utility system applications that promote and enhance system operating efficiency and improve service reliability, such as outage management, reduction of theft and diversion, improved forecasting, and workforce management. Smart meters will send a Power Outage Notification (PON) to the OMS Gateway any time there is a loss of line side voltage of the customer's power. In turn, this will create a trouble order in OMS and the Operations Support Specialist will dispatch a Troublemen to the identified location of the problem. Upon completion of repairs, we will receive a Power Restoration Notification (PRN). Both the PON and PRN will include a date and time stamp which will be populated into OMS.

Start/End Date: 2012-2015

Funding Source: GRC

Update: SCE launched the project in May 2011. SCE subsequently engaged with Itron to refine requirements and install new firmware for better communication from the meters. SCE worked with the OMS vendor to refine and add new enhancements to identify the types of customers in SCE's service territory. SCE held several meetings to do proofs of concept on our new enhancements. User Acceptance Tests (UAT) tests were performed with several parties. SCE reviewed these changes with IT and performed reviews and tests on the system to review performance. Additionally SCE installed several range extenders for better communication and SCE has launched this project into production for proof of concept.

C. Transmission Automation/ Reliability

Transmission Automation/Reliability (TAR) includes projects that provide wide-area monitoring, protection and control to enhance the resiliency of the transmission system. TAR also includes projects to provide the ability to safely and reliably incorporate utility-sized intermittent power generation such as centralized solar and wind energy. TAR projects help mitigating voltage fluctuations resulting from integrating intermittent resources.

The wide-area capabilities of TAR provide the ability to monitor bulk power system conditions, including but not limited to voltage, current, frequency and phase angle, across the IOU geographic area in near real-time. This functionality provides system operators with current information about emerging threats to transmission system stability, enabling preventive action to avoid wide-scale black outs. In addition, the wide-area capabilities of TA also include projects for coordination of high-speed communicating transmission protection equipment that detect conditions in the transmission systems and automatically respond to stabilize the system.

PHASOR Management & WASAS	$7,960,888
Description: In collaboration with the Western Electricity Coordination Council (WECC) and for use by Reliability Coordinators, the PHASOR system will enable SCE to collect, store, verify, and share PHASOR	

Measurement Unit information about the status and health of the grid at millisecond intervals. The PHASOR system will also serve to accommodate compliance obligations, as part of SCE's commitment to participate in the Western Interconnect Synchrophasor Program.

Start/End Date: 2011-2013

Funding Source: GRC

Update: The business planning statement of work, business requirements, and system test plan were successfully completed by the first quarter of 2012. The vendor design statement of work was successfully completed and approved by the second quarter of 2012. The design phase acceptance and sign off was completed by the second quarter 2012. The Factory Acceptance Testing has been completed and Site Acceptance Testing is anticipated to be completed by the fourth quarter of 2012. Work for PHASOR commenced on August 9, 2011 and is scheduled to be completed in the third quarter of 2013.

Centralized Remedial Action Schemes	$21,154,432

Description: CRAS improves architecture, management, oversight, and effectiveness of remedial action. CRAS reduces tripping of generation and/or shedding of load as needed. CRAS is needed because current logic controllers in individual remedial action schemes are limited and cannot cope well with increasing interconnection complexities.

Start/End Date: 2011-2014

Funding Source: GRC

Update: The vendor design statement of work was successfully completed and approved second quarter of 2012. The design phase acceptance and sign off was completed during the second quarter of 2012. The construction of the Central Controller is currently in progress and is anticipated to be completed as planned by fourth quarter of 2012. Work for CRAS commenced on August 9, 2011 and is scheduled to sunset in the fourth quarter of 2014.

Wide Area Protection (Includes TBD- Advanced Relays - Transmission)	$22,471

Description: The Wide Area Protection program includes several projects that will utilize phasor measurement units (PMU) data to adapt the performance of protective relay to the changes in the power system. SCE is working on advanced protection applications such as the Application of Advanced Early Warning System with Adaptive Protection (DOE demonstration project) and the CRAS.

Start/End Date: 2009-2013

Funding Source: GRC

Update: The CRAS deployment project, due to its large size, is covered under its own title in this report. The Application of Advanced Early Warning System with Adaptive Protection is a demonstration project

based on algorithms developed by Virginia Polytechnic Institute & State University (VT) on the use of PMU data in adapting the operation of relays in high-voltage transmission lines. This work was started in October 2010 and is targeted for completion by March 2013. Five entities (California Institute for Energy and Environment (CIEE), SCE, Pacific Gas & Electric Company (PG&E), VT, and Mississippi State University (MSU)) are collaborating on this project. SCE is testing the adaptive protection assembly in its lab, and in October 2012 SCE will deploy it at the Vincent Substation. The system performance will be monitored for six months, and an assessment will be done at the completion of the project.

Wide Area Monitoring	$266,673

Description: This program includes several projects that are aimed at providing situational awareness for system operators. Situational awareness is a combination of advanced tools that give system operators the capability to monitor power system operating conditions, and allow system operators to exercise appropriate actions to ensure security and reliability of the system. SCE is looking into advanced monitoring applications such as Establishing Bus Voltage Phase Angle Difference Threshold Warning/Alarm, Voltage Instability Prediction (VIP) Visualization Screen, and Power system Oscillation Detection Visualization. Another Wide Area Monitoring project is the Integration of Synchrophasor Data (PMU data) with Energy Management System (EMS) and the enhancement of State Estimator using PMU data.

Start/End Date: 2011-2012

Funding Source: GRC

Update: SCE completed the first phase of the VIP project in December 2011 and developed a visualization screen to monitor the voltage behavior of the transmission system using PMU data, which is being tested in real-time to detect problems. SCE is planning to extend this work to include visualization of Fault Induced Delayed Voltage Recovery (FIDVR) in 2013. The first phase of work on Establishing Bus Voltage Phase Angle Difference threshold started in April 2012 and is scheduled for completion in December 2012. The first phase of this work is being done by base-lining collected Supervisory Control and Data Acquisition (SCADA) and PMU data. The second phase of this project will start in 2013 and will use a contingency based analysis to establish warning/alarm thresholds.

Work on the Power System Oscillation Detection started in October 2011. SCE is planning to initiate the work on developing a Hybrid State Estimator in 2013. This enhanced state estimator will integrate PMU data with the SCADA data, which is expected to provide reliable and accurate information to grid operation.

Wide Area Control System (includes FACTS Devices)	$286,450

Description: This program includes several projects that automate and enhance control of important operating functions within the Grid Control Center (GCC) and Substation Operation. These projects address Smart Grid challenges related to reliability. Wide Area Control System projects include Coordinated Voltage Control in SCE transmission Network, Variable Generation Integration and Control, Energy Storage Control, Wide-Area Security Management and Control, and Inter-area Oscillations Damping Control.

Start/End Date: 2010-2013

Funding Source: GRC

Update: The Coordinated Voltage Controller project started in November 2010. Conceptually, it is designed as a two level controller: a local controller at each bulk power substation and a system-wide coordinator at the control center. The local controller uses local measurement (mostly from PMU) and optimally controls local VAR resources within the substation. Local VAR resources available at bulk power substations are shunt capacitors, shunt reactors, and transformer under load tap changer (LTC). The system-wide coordinator calculates optimal voltage schedule, and coordinates local voltage controllers so they do not counteract each other's actions. The first local voltage controller is planned for Devers Substation. The analysis and formulation is complete, and deployment design is scheduled for 2013. The system-wide coordinator's formulation and simulations will start in 2013. The deployment will be completed in 2014.

TBD- Transmission Energy Storage	$0

Description: The California Energy Commission-Public Interest Energy Research (CEC-PIER) awarded the Wind Storage Enhanced Transmission Research and Development project to SCE in April 2008. The project evaluated existing energy storage technology to help integrate renewable resources to the grid. This project also selected two existing sites on the SCE system where renewables were connected to conduct the analysis. The SCE and QUANTA Technologies team chose the Antelope-Bailey 66 kV system and the Devers 115 kV system to study wind generation interconnection. The study concluded that at the Antelope-Bailey site, a 32 MWh battery could help solve some of the overloading and stability issues in the system due to the wind generation in the area. In the case of the Devers system, the team concluded that the best option was a Compress Air Energy Storage system.

The results from the analysis conducted in 2010 and 2011 at the Antelope-Bailey system were the basis for the application to the Department of Energy for ARRA funding. The funding was awarded to SCE for the construction of the Tehachapi Energy Storage Project (TSP), which consists of a 32 MWh lithium-ion battery to show the benefits of energy storage in the integration of renewable resources. Some of the benefits that the TSP project is intended to prove were identified by the CEC-PIER project.

Start/End Date: 2010-2012

Funding Source: California Energy Commission (CEC) Grant

Update: SCE submitted its Wind Storage Enhanced Transmission Research and Development project final report to the CEC in December 2011 and conducted a final presentation February 2012. The report is still in the approval process by the CEC and will be published once approved.

Energy Management System	$5,800,000

Description: The Energy Management System (EMS) provides alarms to inform grid operators when a power line becomes overloaded, or when a circuit breaker opens due to abnormal condition. EMS enables the grid operator to remotely perform critical functions such as opening and closing circuit

breakers to energize or de-energize a line, monitoring load, and gathering timely information related to system conditions and reliability. The EMS also contains transmission security management tools. At the foundation of these tools is the State Estimator. The State Estimator continuously monitors the collected data to detect and correct measurements. These tools give the operator the capability to analyze the electrical system and optimize the operation of the transmission grid under current and postulated system conditions.

The current EMS has the capability to support and integrate advanced Smart Grid capabilities. Refreshes will be necessary to upgrade to the latest versions of the software, re-platform the system onto the same technology base as the new DMS/Advanced Load Control System, and avoid technology obsolescence.

Start/End Date: TBD

Funding Source: GRC

Update: The EMS software was successfully upgraded to the latest release. This refresh involved replacing all EMS servers, operating system software, application software, and networking equipment. Both EMS and DMS are now running at the same release of software and on similar hardware platforms. After extensive testing, the EMS was successfully brought on line on May 2, 2012.

D. Asset Management & Operational Efficiency

Asset Management & Operational Efficiency (AMOE) enhances monitoring, operating and optimization capabilities to achieve more efficient grid operations and improve asset management. AMOE includes projects that will allow SCE to manage the maintenance and replacement of energy infrastructure based on the health of the equipment versus a time-based approach. This functionality will prevent failures of critical energy infrastructure as well as manage costs associated with maintaining and replacing equipment.

Online Transformer Monitoring	$0

Description: Field devices will collect of real-time information about the health of transmission and distribution system infrastructure. The particular field devices that enable equipment monitoring depends on the equipment targeted for monitoring. SCE uses Dissolved Gas Analysis (DGA) technology and bushing monitoring devices for bulk power transformers. SCE has targeted a total of 68 500-kV (AA) and 137 230-kV (A) transformer banks at substations to deploy online transformer monitors. As part of its Online Transformer Monitoring Project, SCE plans to deploy DGA technology and bushing monitoring devices on one AA substation and four A substations per year from 2011 through 2014.

Start/End Date: TBD

Funding Source: GRC

Update: SCE successfully completed the initial pilot installation at a 500kV substation, where a AA transformer bank was equipped with both DGA and bushing monitoring equipment as well as

communication paths to SCE's EMS. The collected data was validated against data at the installed equipment and proved to be accurate. Additionally, SCE is in the final stages of standard development and training deployment for this project. SCE expects to continue progress of this project on AA and A substations in the coming years.

E. Security

Physical and cyber security protection of the electric grid is essential and becomes more important as the Smart Grid is deployed. The communications and control systems that enable Smart Grid capabilities have the potential to increase the reliability risks of Smart Grid deployments if they are not properly secured. The Security program includes a comprehensive set of capabilities to address the increased physical and cyber security requirements associated with the development, implementation, operation and management of Smart Grid systems and edge devices. These projects would place and execute security throughout the network to resist attack, manage compliance and risk, and support security from the physical to application layers.

8. Security (Physical & Cyber)

Smart Grid Cyber Security	**$8,588,815**
Description: SCE's future cyber security solution will provide centralized coordination and monitoring of thousands of smart devices deployed throughout the transmission and distribution system. Device key management, cryptographic services and security configuration management will be employed to protect communication with and control over various Smart Grid technologies. Centralized cyber security services will be built into all Smart Grid information systems varying in the function, architecture and sensitivity of the data they transmit. Cyber security will include audit and reporting management for enhanced threat detection, notification and reporting as well as security integration to provide coordination protection across interconnecting systems. Start/End Date: TBD Funding Source: GRC	
Update: SCE has contracted with ViaSat for the development of SCE's future Smart Grid cyber security solution, Common Cybersecurity Services (CCS). ViaSat has completed the design specifications for centralized and edge devices security services and is in the process of building a reference implementation and assisting our Smart Grid demonstration project partners with CCS integration. SCE has filed patents for the new Smart Grid cyber security technology and plans to make the technology available to the electric utility industry. SCE is currently working with GE and others to integrate the new CCS technology into its Smart Grid demonstration projects. SCE plans to deploy the new CCS technology on all future Smart Grid projects.	

F. Integrated & Cross Cutting Systems

Integrated and cross-cutting systems refer to projects that support multiple Smart Grid domains, such as grid communications, application platforms, data management and analytics, advanced technology

testing, and workforce development/technology training. An integrated approach ensures that investments are managed efficiently while creating the platform to deliver a stream of benefits across utility operations and to customers.

Integrated communications systems provide solutions to connect and enable sensors, metering, maintenance, and grid asset control networks. In the mid-to-long term, integrated and cross cutting systems will enable information exchange with the utility, service partners and customers using secure networks. Data management and analytics projects will improve the SCE's ability to utilize vast new streams of data from transmission and distribution automation and smart meters for improved operations, planning, asset management, and enhanced services for customers.

Advanced technology testing and standards certification are a foundational capability for the utilities to evaluate new devices from vendors and test them in a demonstration environment prior to deployment onto the electric system. This reduces the risks associated with new technology projects, and helps the utilities maximize technology performance and interoperability.

Workforce development and advanced technology training enable the successful deployment of new technologies, ensuring that the utilities' workforces are prepared to make use of new technologies and tools, maximizing the value of these technology investments.

Substation Automation System Replacements	$0
Description: This project implements an International Electrotechnical Commission (IEC) 61850 standard Substation Automation System for SCE's distribution substations, which will be piloted at MacArthur Substation in June 2013. Functions and features will include open standard design supporting Manufacturer's Message Specification (MMS) and Generic Object Oriented Substation Events (GOOSE) communication protocol support for multi-vendor Intelligent Electronic Devices (IEDs). Additional benefits will be automatic system configuration including Substation Gateway, Human Machine Interface (HMI) and IEDs, which will eliminate the requirement for vendor HMI configuration. Start/End Date: 2011-2014 Funding Source: GRC	
Update: SCE will continue upgrading the remaining installed Substation Automation System (SAS) designs, which was SCE's first substation automation with the current open standard, Substation Automation-2 (SA-2) through the end of 2014. SCE will additionally commission a new Substation Automation-3 (SA-3) IEC 61850 standard based Distribution Substation Automation System at MacArthur Substation in June 2013. This pilot will transition SCE to the new standard which will begin production in 2015. SCE will complete a transmission substation automation system pilot, demonstrating an IEC 61850 redundant design for commissioning by the fourth quarter of 2015. This pilot will additionally demonstrate process bus architecture (IEC 61850, resultant architecture replaces breaker to protective relay copper wiring with fiber to reduce construction costs and to improve noise immunity).	

Advanced Technology Labs	$1,571,000

Description: SCE's Advanced Technology Labs environment provides an integrated platform for evaluating the safety and operability of Smart Grid technologies without impacting customers by testing on distribution circuits or other equipment.

Start/End Date: TBD

Funding Source: GRC

Update: SCE has completed the construction and development of the Advanced Technology Labs and transitioned them into operation. The SCE Advanced Technology Labs consist of the following:

- **Situational Awareness Lab** - Allows SCE to monitor the status of the electric grid and display test data from adjacent labs. Utilizing Hiper-Wall technology – a scalable video wall – this facility is also able to analyze historic outage data using proprietary system modeling tools.

- **Communications and Computing Lab** – Provides a platform to test and evaluate Smart Grid communications and cyber-security hardware, software and systems. Understanding the properties of high-speed, low latency and wireless communications networks is critical to the development of a digitally networked grid.

- **Power Systems Lab** – Utilizing a Real Time Digital Simulator (RTDS) – power system simulator – allows SCE to perform closed-loop testing of protection and control equipment and power system studies. These studies are conducted to understand the impact of large scale renewable integration, as well as develop more sophisticated wide area monitoring, protection and control capabilities for the electric grid.

- **Distributed Energy Resources Lab** – Inverter based generators and loads, such as residential solar panel batteries and air conditioners, are tested and evaluated in SCE's Distributed Energy Resources Lab. Understanding the behavior of these devices during grid faults and voltage and frequency transients will help SCE continue to maintain a reliable distribution system.

- **Substation Automation Lab** – Designed for interconnecting and testing next generation substation communications, automation and protection equipment. Incorporating these secure and open standards-based systems will help SCE continue to maintain smarter, safer and more reliable substations.

- **Distribution Automation Lab** –Evaluates the performance of advanced field devices to develop an integrated, scalable and fully automated distribution system. These efforts will help SCE safely and reliably manage the integration of distributed energy resources such as residential solar panels and plug-in electric vehicles.

- **Home Area Network Lab** - Helps provide customers with advanced tools and resources that will enable informed and responsible energy use. The lab evaluates third party smart energy devices to ensure compatibility with Edison SmartConnect meters and SCE's rate programs and services.

- **Garage of the Future Lab** – Demonstrates and evaluates the synergy of various technologies including distributed energy storage, renewable energy resources, plug-in electric vehicle charging infrastructure and Edison SmartConnect® meter communication.

Substation Automation Integration IEC 61850	$0

Description: The goal of Phase II is to transition to an open standards based automation and control system design demonstrating secure Smart Grid interoperability while allowing seamless integration to future Smart Grid standards. The functional enhancements proposed include Communications Security, Automatic Configuration and Configuration Management, Remote Secure Access, PMU Data Collection, and Substation to Field Area Network Interoperability. Process improvements supporting these functional enhancements include IEC 61850 standard based XML formatted configuration for all substation devices generated from the Substation Engineering Modeling Tool (SEMT) and the Node Category Standards (NCS) Library which will house relay configurations for each of SCE's in-service protective relay applications. The new SA-3 Substation Automation design will ultimately (in Phase III) support integration of SCE's installed legacy Modbus Plus and Modbus TCP designs when power grid changes are made to these systems. Successful implementation of SA-3 will result in measurable engineering, operations and maintenance benefits through cost reduction, reliability and safety.

Start/End Date: 2013-2015

Funding Source: GRC

Update: SCE is demonstrating the implementation of SA-3 at the MacArthur Substation system which is expected to be developed and component lab tested by the end of 2012 with completion of comprehensive Acceptance Testing by February of 2013. SCE expects to have all equipment installed and commissioned at MacArthur Substation by July 1, 2013. This will be a 2 year demonstration project from July 2013 to July 2015 as part of DOE funded project. The SA-3 project includes three main sub-projects:

- SCE's SEMT 61850 will generate XML formatted files necessary for configuration of all substation automation relays, HMI, managed switches, ETMs, and Substation Gateway.
- HMI-3 will be capable of directly consuming IEC 61850 XML files and then generating the database and Graphic User Interface builds.
- Substation Gateway will be capable of configuring networked edge devices using the IEC 61850 standard based XML files.

RD&D Balancing Account	$2,203,377

Description: The RD&D Balancing Account was established to track and fund a host of Smart Grid related projects that SCE intends to invest in over time. SCE is investing in these projects to meet California's ambitious energy policy goals. SCE's projects will enable a broad range of Smart Grid capabilities aimed at delivering a cleaner energy future, a more informed customer, and a more reliable electric system.

Start/End Date: TBD

Funding Source: GRC

Update: Spending and project related activities decreased as a result of the delayed 2012 GRC decision, which determines the status of funding for projects. As a result, SCE only expended approximately $136,747.65 from the RD&D Balancing Account between January 1, 2012 and June 30, 2012.

Distribution System Efficiency Enhancement Project	$4,656,358

Description: The Distribution System Efficiency Enhancement Program (DSEEP) consists of servicing and expanding the NETCOMM wireless communication system. The NETCOMM system provides the radio communication infrastructure to remotely monitor and control SCE's distribution automation devices. These automation devices include all of the devices deployed under the Circuit Automation and Capacitor Automation programs described above.

Start/End Date: TBD

Funding Source: GRC

Update: SCE added 732 distribution automation devices from July 2011 to June 2012. 107 packet radios were also added, extending communication to the new devices. These endpoints include Radio Controlled Switches, New Capacitor Banks and Automated Reclosures. The program also maintained radio infrastructure to existing devices. This maintenance includes supporting 275 automation device replacements, 237 packet radios to maintain network performance levels, and the replacement of 567 end-of-life battery-backed radios.

Mobile Radio System Upgrade	$0

Description: SCE linemen in the field rely on push-to-talk land mobile radio (LMR) system for voice communications. SCE currently uses Motorola analog SmartZone 4.1 LMR which will reach the end of its useful life by 2015. Deferring the Mobile Radio System upgrade beyond 2015 presents a significant safety risk because technical support and repairs will end. SCE's existing towers, antenna and spectrum can be reused with no significant operational adjustments.

Start/End Date: 2012-2014

Funding Source: GRC

Update: SCE plans to upgrade the existing Motorola analog SmartZone 4.1 to Digital IP Astro 25. Motorola has over 300 existing Astro P25 Platform customers and will provide SCE an easy migration process. A "folk-lift" upgrade is not feasible due to the very large geographic service area (about 70,000 square miles) and large amount of hardware.

Next Generation Network, SCEnet II	$0

Description: SCEnet II will be the next generation converged, highly scalable, resilient, cost-effective,

secure and high performance network to support current and future grid and administration applications. SCEnet II is the re-architecture of SCEnet, which will support logical separation of multiple networks, low latency demanding applications and applications with bursty and variable bandwidth requirements. SCEnet II is becoming even more important to meet emerging requirements, such as increased regulatory mandates, higher security standards, growth in data traffic, increased enterprise collaboration, a more mobile workforce and two-way communications needs of Smart Grid market participants.

Start/End Date: TBD

Funding Source: GRC

Update: SCE plans to develop a high-level design that identifies prioritized B substations and Multi-Protocol Label Switching. The initial design will collapse a number of networks onto shared network hardware at each targeted location in support of various projects, including: Alhambra Control Platform (ACP); Advanced Load Control System (ALCS); Centralized Remedial Action Scheme (CRAS); Data Beyond SCADA (DBS); Digital Fault Recorder/Phasor Measurement Unit (DFR/PMU); Distribution Management System (DMS); and Substation Automation (SA3). The following on-going projects will be part of SCEnet II: Advanced Technology Organization Labs (ATO); Energy Management System (EMS); Irvine Smart Grid Demonstration (ISGD); and Tehachapi Wind Energy Storage Project (TSP). SCE is studying whether to integrate video surveillance, the SCE administrative network, and the Field Area Network into SCEnet II.

PEV Readiness	$8,379,000

Description: The PEV Readiness Program (PEVR) was formed to prepare the utility for the arrival of plug-in electric vehicles (PEVs) and help deliver a positive experience to PEV adopters. SCE is measuring performance of the utility in executing PEV-related customer processes, including neighborhood grid assessment and reinforcement and conducting continuous improvement. SCE is also monitoring leading indicators of PEV adoption and updating PEV sales forecasts and assumptions used to plan for O&M and capital expenditures. SCE has executed education and outreach efforts to residential and non-residential customers and engage with external PEV stakeholders to facilitate the deployment of charging equipment.

Start/End Date: TBD

Funding Source: GRC

Update: PEVR Program has updated customer processes to serve the Electric Vehicles Standards Panels (EVSP) in residential environments, including single and multi-family residences. SCE has also developed roadmap and timeline to implement a protocol for third-party-owned submeters. SCE implemented third-party notification arrangements with most in-market OEMs and pilot programs with local cities and counties. SCE also continued significant engagement of state and local agencies and organizations (including CARB, California PEV Collaborative, SCAQMD, etc.). Lastly, SCE has launched a comprehensive PEV website for residential and non-residential customers, PEV dealers, and electricians/EVSE installers.

4G Wireless Network	$0
Description: 4G is the fourth generation of the wireless communications standard. The 4G wireless network will enable field area network to support AMI direct meter communication, passive distribution monitor/control, video surveillance, and line-person-of-the-future mobile applications. Start/End Date: TBD Funding Source: GRC	
Update: The Middle Class Tax Relief and Job Creation Act of 2012 authorized the Federal Communications Commission ("FCC") to hold incentive auctions, reallocate the 700 MHz D block spectrum for use by public safety entities, and reserve $7 billion from the auction proceeds for the construction of a nationwide interoperable public safety network. Electric utilities can now share the public safety broadband network (PSBN) 700-MHz spectrum to promote emergency response and Smart Grid and other advanced applications. SCE may be able to take advantage of the 700-MHz auctions and part of the $7 billion federal funding to build up a wireless network to enable many critical applications, such as SmartGrid and lineperson of the future. SCE completed a pre-engineering 700-MHz coverage study, cost estimate, and deployment plan. SCE has been working closely with Edison Electric Institute (EEI), Utilities Telecom Council (UTC) and peer utility companies to monitor the progress of regulatory policy changes. SCE also completed the Airspan 1.4 GHz wireless, which is the only 4G wireless licensed spectrum available for SCE to use. SCE's study indicated that Airspan's complex spectrum ownership arrangement, possible financial instability, and proprietary technology make a large investment undesirable. SCE will continue to develop a broadband wireless roadmap for 4G and Land Mobile Radio in order to anticipate developing the GRC Yellow Book for 2015-2018.	

IV. Customer Engagement Timeline

Commission staff, through the Smart Grid Workshop Report, recommended that this Annual Report include a timeline that connects Smart Grid efforts with specific marketing and outreach plans, and steps to overcome customer engagement roadblocks. Consistent with the Commission Staff's recommendations, SCE provides such information in this chapter. This chapter has four sections. Section A provides an overall summary of how customer education and outreach supports the Commission's Smart Grid vision. Section B describes SCE's outreach to customers and other stakeholders. In Section C, SCE details its outreach timeline and approach for its Smart Grid customer programs and services. Finally, in Section D, SCE describes the outreach channels for its Smart Grid infrastructure elements.

A. Smart Grid Outreach Is Critical to Achieving California's Smart Grid Vision

As described in D.10-06-047,[22] the Commission's Smart Grid vision includes smart customers "who are informed about the Smart Grid and [are able] to use electricity more efficiently and save money." In addition, the California utilities "should demonstrate a proactive approach to consumer education and outreach," and should also "enable consumers to capture the benefits of a wide range of energy technologies and management services." As such, customer education and outreach is an important tool to inform and engage customers in Smart Grid programs and technologies and to achieve the Commission's Smart Grid vision.

B. Smart Grid Outreach to Customers and Other Stakeholders

SCE provides Smart Grid outreach to customers, local and regional governments, and other stakeholders. Outreach to residential and small business customers includes marketing, education, and outreach (ME&O) tailored by customer type, behavioral characteristics, current program enrollments, and communication channels (see section C for more information). Outreach to local and regional governments includes educating public officials, legislators, and policy makers across multiple governmental entities, including cities, counties, and land agencies. In addition, SCE performs outreach activities to the general public through the news media and community organizations. Outreach to governments and other stakeholders addresses both Smart Grid infrastructure projects and customer programs and services (see Section D for more information). As described below, SCE tailors its outreach approach to customers, local and regional governments, and other stakeholders depending on whether the messaging is related to customer programs and services, or for Smart Grid infrastructure elements.

C. Outreach for Smart Grid Customer Programs and Services

SCE's approach to coordinating ME&O across Demand Side Management (DSM) programs is consistent with the Commission's Smart Grid vision.[23] As stated in the California Long-Term Energy Efficiency Strategic Plan, a comprehensive and coordinated DSM ME&O approach "must be offered in a unified fashion so that energy users receive complete DSM information with minimum effort, preferably through single points of contact."[24]

As described below, SCE's customer outreach supports the Commission's Smart Grid and DSM visions by expanding on the traditional customer relationship approach to provide ME&O that supports SCE's Smart Grid enabled DSM programs and services.

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[22] Decision Adopting Requirements for Smart Grid Deployment Plans Pursuant to Senate Bill 17 (Padilla), Chapter 327, Statues of 2009, June 24, 2010.

[23] Per D.12-05-015, page 331, DSM refers to three primary demand-side energy resources: energy efficiency, demand response, and distributed generation.

[24] See California Long-Term Energy Efficiency Strategic Plan, California Public Utilities Commission, September 2008, page 72.

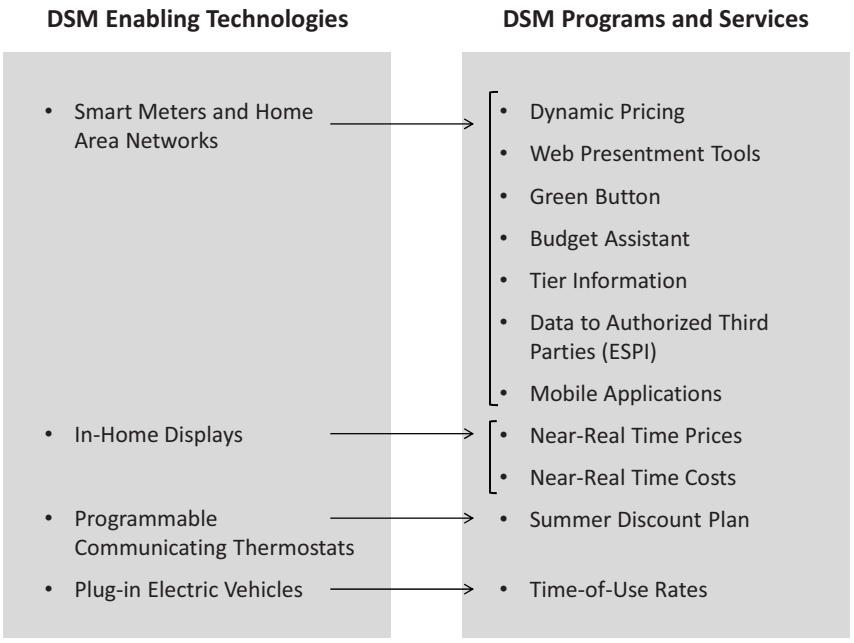
1. Smart Grid Technologies Enable New Programs and Services

SCE's smart meter capabilities (e.g., interval data measurement, HAN) enable other Smart Grid technologies such as In-Home Displays (IHDs), Programmable Communicating Thermostats (PCTs), and the provision of interval and near-real time usage data to customers. In turn, these emerging Smart Grid technologies enable new programs and services offered by SCE and third party providers.

Some programs and services were anticipated at the time the Commission authorized SCE's AMI programs (e.g., HAN, IHDs, PCTs), while others have only recently been envisioned and are under development (e.g., mobile applications and near real-time costs). As such, SCE continues to integrate such technologies into its DSM portfolio offerings and marketing approach. A summary of SCE's enabling technologies and new programs and services enabled by the Smart Grid is provided in Figure 4 below.

Figure 4

Summary of Emerging DSM Programs and Services Enabled by Smart Grid Technologies



2. SCE's Smart Grid Enabled Programs and Services Will Be Marketed Using SCE's Offer Management Strategy

SCE's Smart Grid enabled programs and services will add significantly to its current DSM portfolio offerings. Given the multitude of programs and services and the new enabling technology offerings, customers are faced with many decisions regarding which programs and services are best suited for

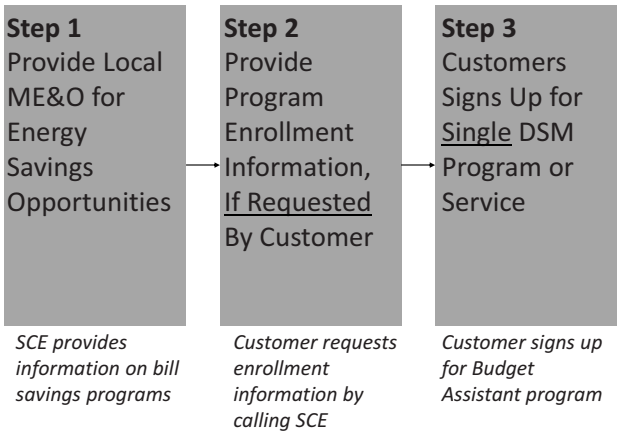
them. A new customer relationship approach is required to actively engage customers in energy management without confusing them.

SCE's new customer relationship approach is designed to replace the current model of one-way customer transactions (i.e., receive and pay bill) and to reduce the amount of research required by customers to determine which programs and services would be relevant and beneficial for them. In the old model, for example, customers may peruse utility websites and research various ME&O materials to determine which programs and services would be beneficial for them. This research requires active customer involvement, and customers may experience information overload and become discouraged from doing further research. See Figure 5 for a depiction of the current traditional customer relationship approach.

Figure 5

Traditional Customer Relationship Approach

(Illustrative example in italics)

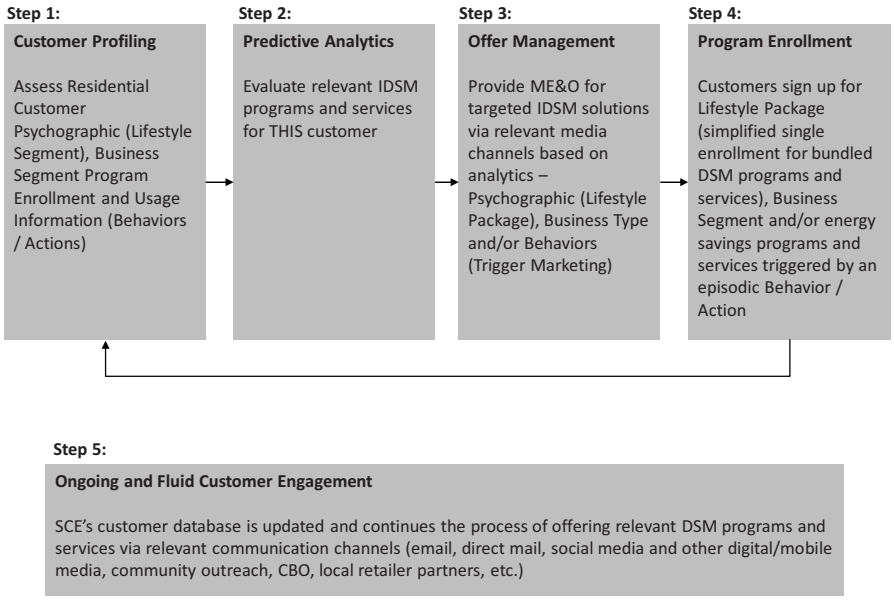


SCE's new customer relationship approach focuses on a dynamic and proactive approach to customer engagement, which will leverage customer information (e.g., rate and program enrollments, Smart Grid enabled usage characteristics) to provide a customized bundle of programs and services (i.e., SCE's Lifestyle Packages[25]) to each customer. SCE's new Customer Relationship approach is depicted in Figure 6 and is described further below.

[25] Residential Lifestyle Packages will bundle key DSM programs and services together for customers based upon a motivating driver. SCE's Residential Lifestyle Packages are as follows: (1) Quick-Start – for customers who like to keep it simple, but also look for new opportunities to save, (2) Go-Green – for earth-conscious and price-conscious customers, (3) Cost-Cutter – for customers who seek every opportunity to achieve maximum savings, (4) In-Command – for customers who like to take advantage of the latest energy management tools to save time and money, and (5) Take Charge – a special package to help ESA program customers manage their budget and their energy usage.

Figure 6

Offer Management: SCE's Customer Relationship Approach



3. SCE's Smart Grid Enabled Programs and Services Are Part of SCE's Integrated DSM Vision

SCE's Smart Grid enabled programs and services are part of SCE's integrated DSM vision, where customers who effectively manage their energy usage by becoming aware of how actions affect their consumption, enroll in the appropriate rate for their usage pattern, adopt new energy management technologies, and implement energy efficiency measures. For this transformation to occur, SCE will use its Offer Management[26] strategy tools to increase customer engagement. This approach will leverage SCE's customer analytics, Smart Grid enabling technologies, and SCE's supporting infrastructure to provide customers with integrated solutions that are relevant to their particular energy management needs. This comprehensive customer engagement allows SCE to anticipate customer needs and to provide customers with the Smart Grid enabled energy management tools and solutions they want and value.

In addition, a mix of channels and languages will be used to reach and engage customers in Smart Grid enabled programs and services. Channels may include: the SCE bill, mass media, in-language media,

[26] For more information on SCE's Offer Management strategy, see Testimony of Southern California Edison in Support of Its Application for Approval of its Statewide Marketing, Education & Outreach Activities and Budget for 2013-2014, A.12-08-008, SCE-1, August 3, 2012, pages 6-17.

direct mail, community events, email, sce.com, online marketing, social media, mobile applications, outbound calling, and outreach events. Additionally, SCE will coordinate with local governments, community organizations and third parties (e.g., retailers, dealers, manufacturers, trade organizations, electricians, installers, and automakers) to inform and educate customers.

4. Smart Grid Customer Engagement Timeline

In its Smart Grid Workshop Report, CPUC staff requested that the IOUs include the following information in their Smart Grid Annual Reports:

1. Timeline that connects specific projects with specific marketing and outreach efforts; and

2. Specific steps to overcome roadblocks, as identified in the workshops.

In addition, CPUC staff requested that SCE provide marketing and outreach information using the sample template in Appendix 1 to the Smart Grid Workshop Report. SCE has expanded on this sample template by recognizing that certain ME&O efforts are not confined to a single calendar year. Consistent with this approach, SCE provides its Customer Engagement Timeline (Figure 7 below) which presents the appropriate initiatives provided in SCE's Customer Engagement Baseline and Roadmap Summary, and identifies the anticipated Smart Grid related ME&O efforts by year. Consistent with its GRC and DR application cycles, SCE provides such information from 2012 to 2014. Information beyond 2014 is not available, as SCE has not developed detailed ME&O plans beyond its 2012-2014 application cycles.

Figure 7

Customer Engagement Timeline

	2012	2013	2014
Customer Premise Devices			
A. Smart Meters	X		
B. Summer Discount Plan*		X	X
C. Near Real-Time Usage (HAN)*[27]		X	X
Online Tools			
D. Integrated Audit Tool	X	X	X
E. Web Presentment Tools*	X	X	X
F. Budget Assistant*	X	X	X
G. Green Button	X	X	X

[27] Certain HAN-related pilot efforts commenced in 2012. See Appendix 1 for more information.

H. Energy Service Provider Interface		X	X
I. Mobile Outage Application	X	X	X
Rates and Programs			
J. Save Power Day (PTR)*	X	X	X
K. Dynamic Pricing and TOU Rates*		X	X
L. PEV Time-of-Use Rates*	X	X	X

X = SCE or third party ME&O to support this initiative. Certain initiatives (e.g., dynamic pricing, web presentment tools) are dependent on CPUC approval of SCE's applications, including SCE's 2012 GRC application (A.10-11-015), SCE's 2013-2014 EE application (A.12-07-004), and SCE's ESPI application (A.12-03-004).

** SCE will market these program / services through its Offer Management Approach, as described previously.*

5. Smart Grid Engagement by Initiative

In its Smart Grid Workshop Report, CPUC staff requested specific steps to overcome customer engagement roadblocks. More specifically, in Appendix 1 of the Smart Grid Workshop Report, CPUC Staff requested the following information for each identified Smart Grid related ME&O effort:

- Project description;
- Target audience;
- Sample message;
- Source of message;
- Current road blocks; and
- Strategies to overcome roadblocks.

Thus, for each initiative identified in Figure 7, SCE has provided such information in Appendix 1 of this report. In addition to discussing the initiatives identified above, Appendix 1 also includes SCE's customer engagement activities for certain pilots and demonstration projects , and for conceptual projects.

D. Outreach for Smart Grid Infrastructure Elements

1. Outreach Efforts

SCE provides outreach for its Smart Grid infrastructure projects, and this effort is tailored for each project depending on the type of project and anticipated concerns, if any. This tailored approach may include educating local and regional governments, media, and other stakeholders.

Outreach to governmental officials and entities and the public depends on whether there is a need to educate these stakeholders and their level of interest on certain Smart Grid infrastructure projects. SCE's typical outreach efforts include individualized contact with public officials, legislators, policy makers, governmental agencies, and other stakeholders to educate them on the purpose and need for a particular project. If there is a need to provide outreach to a wider audience such as the public, SCE develops fact sheets, sends mailers, conducts presentations to local community and business organizations, provides information at community events, or hosts public meetings and workshops. SCE also uses traditional media outlets, online and social media, or advertising to inform the general public.

In addition, SCE provides mainstream media outreach for Smart Grid projects, such as the Irvine Smart Grid Demonstration and the Tehachapi Energy Storage project, when there are working components for journalists to observe. In addition, SCE reaches out to industry and trade publications, which take interest in specific projects related to the Smart Grid. Also, smart meters have also been addressed through reactive media opportunities, particularly when issues are raised about customer privacy security in how customer data is handled.

2. Smart Grid Infrastructure Elements

Certain Smart Grid infrastructure projects are required to provide Smart Grid-enabled DSM programs and services to SCE's customers. Generally, these infrastructure projects are not customer facing and, as such, SCE will provide outreach to local governments and other stakeholders through media relations, sce.com, and other tailored messaging, as appropriate. This outreach approach may be used for the infrastructure projects and is listed below. See Section III for more information for each infrastructure element.

- Platform Infrastructure – AMI Network/Back Office Systems, Premise Area Network, Customer Information Systems, SCE.com Enhancements, Field Area Network, Substation LAN, High Speed Backbone, Distribution Management System, Outage Management System, Geographical Information System, Workforce Computing Devices, Energy Management System, and Cyber Security.

- Distribution and Substation Automation – Distribution Switching Equipment / High-Speed Protection Communication Network, Distribution Volt/VAR Devices, Advanced Relays, and Energy Storage.

- Transmission Automation – Phasor Measurement Units; Wide-Area Situational Awareness System (WASAS), C-RAS Central Controller/Telecomm, Advanced Relays, Wide-Area Control System, FACTS Devices / OTC Mitigation, and Energy Storage.

- Asset Management – Online Transformer Monitors and Smart Distribution Transformers.

- Customer Empowerment Deployments – Dynamic Pricing Systems, Alerts and Notifications Systems, PEV Support Systems, DR Systems Enhancements, HAN Support Systems. Load

Control System Enhancements, Metering Capital Requirements, and On-Going Customer System Enhancements.

V. Risks

In this section, SCE provides an overview of activities related to helping ensure grid reliability for its customers. The sections below provide an overview of the motivation behind developing open standards for Smart Grid infrastructure and cybersecurity investments and solutions.

A. Introduction – Smart Grid Motivation

After nearly a century of building and operating a power delivery network that fuels economic and societal growth with access to stable and reliable electricity, the electric grid is undergoing a profound transformation. Progressive policy objectives and emerging energy technologies motivate the integration of renewable resources, distributed generation, electric transportation, energy storage and other emerging energy technologies which can undermine the basic principles that support grid reliability today. Specifically, the principles that support the stability and reliability of the electric grid include relying on large synchronous rotating mass in bulk generating plants to provide the inertia necessary to propagate a robust waveform across the system. This inertia allows the electric grid to manage most loading and transient events without impacting customers. Wind and solar power, distributed generation and power electronics, coupled with decommissioning of once through cooling plants, erode the inertia in the system, causing a more fragile waveform that, if not compensated for, will reduce reliability and stability. A thoughtfully designed, smarter electric grid will allow the integration of new energy technologies with smart inverter controls and will advance our ability to meet policy objectives without degrading the stability of the electric grid. Further studies are needed to ensure that the removal of the once through cooling generators does not cause stability issues or cause the need for new transmission or other technological additions.

B. Smart Grid Architecture Challenges

In order to shift today's electric grid from a system that is robust and reliable largely due to the basic laws of physics to a smarter electric grid that increasingly relies on technology to maintain stability and achieve a higher level of resilience, we must apply a rigorous understanding of systems theory, power systems, computer science and utility operations. Applying these diverse and specialized disciplines in a coordinated approach that yields cost-efficient, manageable and reliable solutions requires a clear Smart Grid strategy and architecture approach. The key architecture challenge in evolving the electric grid is to ensure that the introduction of automation, connectivity and advanced control systems do not create a system too complex or fragile to manage. Utility companies have tended to rely heavily on highly customized solutions that were organized in a silo of proprietary devices, communications, security, configuration and control systems. This approach is commonly known as "security by obscurity." While this approach was efficient for each individual project with clear scope, schedule and cost objectives, it

results in a higher cost of maintenance and operations and a higher cost of new capabilities because each silo requires integration. If this approach is applied to grid modernization, the result will be a costly and fragile infrastructure that will impact grid reliability. An integrated approach to systems design, coupled with a common services architecture, is required to overcome this architecture challenge.

C. Cost Efficient Smart Grid Design

The most cost efficient approach to deploying Smart Grid capabilities is to organize technologies and systems in loosely coupled, standards-based layers capable of supporting common services. A Smart Grid common services architecture delivers the capability for any device in the forward deployed networks to access common services (such as cybersecurity, device management, network monitoring, etc) in SCE's control centers. The common services architecture supports multi-vendor interoperability through the enforcement of standards across the architecture and drives implementation and operational costs down by simplifying the systems design through the elimination of silos that extend from the application layer through the security, communications and device layers. Over the past several years, SCE has been working to develop a Common Cybersecurity Service based on the premise that the level of automation and connectivity that is being introduced through grid modernization efforts requires military-grade cybersecurity to ensure grid reliability in the face of increased cyber vulnerabilities introduced by new Smart Grid technologies.

D. Standards Overview

SCE has a long history of supporting the development of open standards. SCE recognizes that standardization of key areas can yield benefits to both consumers and service providers. Such benefits include enabling market innovation, reducing complexity, and protecting investments necessary to ensure long term deployments. In addition, participating in standards development allows SCE the ability to prevent vendor "lock-ins" and ensure interoperability with legacy systems. Furthermore, SCE's participation in standards development brings extensive technical knowledge and experience along with utility credibility to the relevant working groups and organizations. SCE's approach to standards and interoperability includes supporting the development of the actual standard, laboratory testing and evaluation, and field trials.

SCE has identified over 70 standards of interest for Smart Grid development. Of these 70 standards, SCE's Advanced Technology organization is currently supporting the development of over 40 standards. These standards are in specific areas of interest, including system integration/architecture, data formats, communications, security and electrical interconnections/power quality. Many of these standards are being developed by the Institute of Electrical and Electronics Engineers (IEEE) and the International Electrotechnical Commission (IEC). SCE is or has been involved in the development of standards, testing and verification within these organizations including:

- IEEE P2030: Guide for Smart Grid Interoperability
- IEEE1547: Distributed Energy Resource Interconnection Standard

- IEC 61850: Substation Automation
- IEC 62351: Power systems management and associated information exchange – Data and communications security

It is important to acknowledge that extensive involvement in standards development can pose many challenges to an organization. Such challenges include finding internal resources, both human and financial, to support the relatively long and exhaustive process. Standards often require fairly senior staff that is experienced and knowledgeable. Senior staff is then under significant pressure to not only support important core job functions but to also support the standards development. From a financial perspective, organizations not only need to finance staff for participating in standards development and paying applicable fees, but additionally some organizations resort to expensive consultants to fill in gaps when full time staff is severely impacted and or unavailable. Specifically, participation in IEC standards can be rather difficult for regional electrical utilities to justify travel overseas.

1. NIST Smart Grid Standards Coordination

The 2007 Energy Independence and Security Act (EISA) gave the National Institute of Standards and Technology (NIST) the "primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of Smart Grid devices and systems." To achieve this mandate, NIST devised a three-phased approach to identify an initial set of standards, while providing a robust process for continued development and implementation of standards as needs and opportunities arise and as technology advances. In 2009, NIST created the Smart Grid Interoperability Panel (SGIP) as a public/private partnership to coordinate the identification and development of Smart Grid standards. Since then the SGIP has grown to an organization representing twenty-two stakeholder categories and over 770 member organizations ranging from electric utilities to consumer electronics providers. One of the obligations of the SGIP is to produce and maintain a Catalog of Standards that could be used for the development and deployment of a robust and interoperable Smart Grid.

SCE is a strong supporter of the NIST / SGIP standards process. Since its onset, SCE has participated in the effort and held leadership positions within the governing board, the architecture committee and various Priority Action Plans (PAPs). Most recently, SCE's director of Advanced Technology (AT) was nominated and elected as a governing board member representing the "at-large" category. Additionally, AT's director of Engineering Advancement was also nominated and elected into the SGIP's recently created Implementation & Methods Committee (IMC). Furthermore, SCE has received various SGIP recognitions for its efforts in PAPs. SCE has participated in the first 16 PAPs, including:

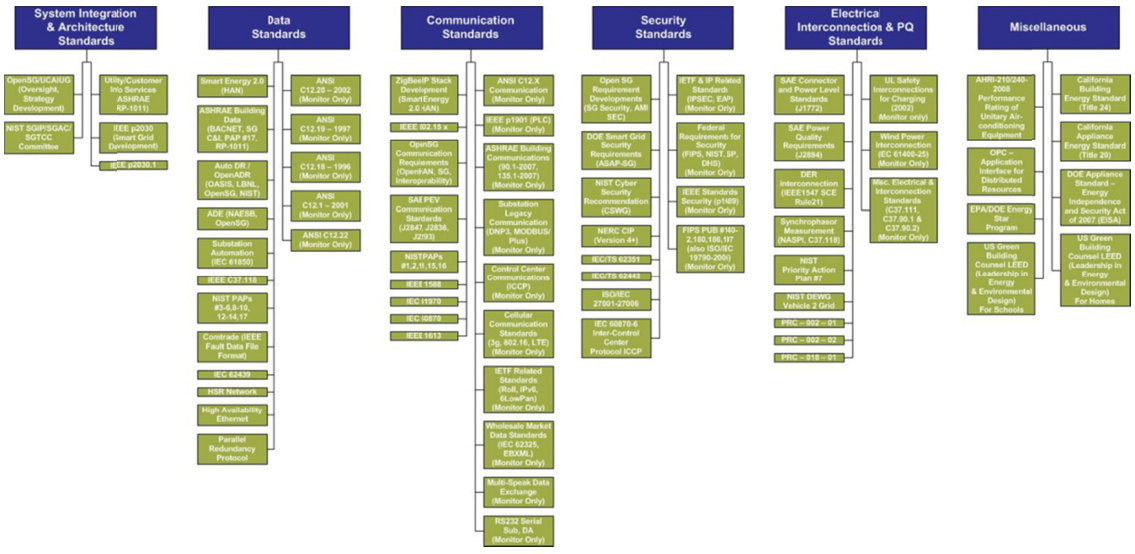
- PAP 5: Standard Meter Data Profiles
- PAP 8: CIM for Distribution Grid Management
- PAP 11: Common Objective Models for Electric Transportation
- PAP 15: Harmonize Power Line Carrier Standards for Appliance Communication in the Home

PAPs have been an effective tool in identifying gaps among Smart Grid standards while providing standards development organizations (SDOs) with meaningful recommendations. However, PAP groups occasionally expand their focus beyond the immediate task. SCE respectfully notes that PAPs require proper NIST/SGIP leadership and oversight to avoid "scope creep." SCE has assisted in this leadership by providing sound technical advice.

2. Standards Development

SCE's vision of a Smart Grid requires the development, evaluation and implementation of open standards. SCE identified five categories that represent the bases for developing the Smart Grid: System Integration & Architecture, Data, Communication, Security, and Electrical Interconnection standards. SCE has identified existing standards within these major categories and identified "gaps" within the existing standards. SCE prioritized the standards and assigned resources to either lead, support or monitor the particular standard. Using this process, SCE identified over seventy applicable standards and assigned resources to lead or support over forty standards. Some of the more notable standards either led or actively supported by SCE include:

- IEC 61850: Substation Automation
- Smart Energy 2.0: Home Area Network Communications
- NAESB ESPI: Automated Metered Data Exchange (e.g. Green Button)
- SAE J2836 & J2847: Electric Vehicle to Grid Communications
- SAE J2894: Electric Vehicle Charging Power Quality
- IEEE 1547: Distributed Energy Resources Interconnection
- ANSI C37.118: SynchroPhasor Measurements
- IEEE P2030: Guide for SG Interoperability of Energy Technology
- OpenADR: Automated Demand Response



*SCE's Categorized List of Smart Grid Standards

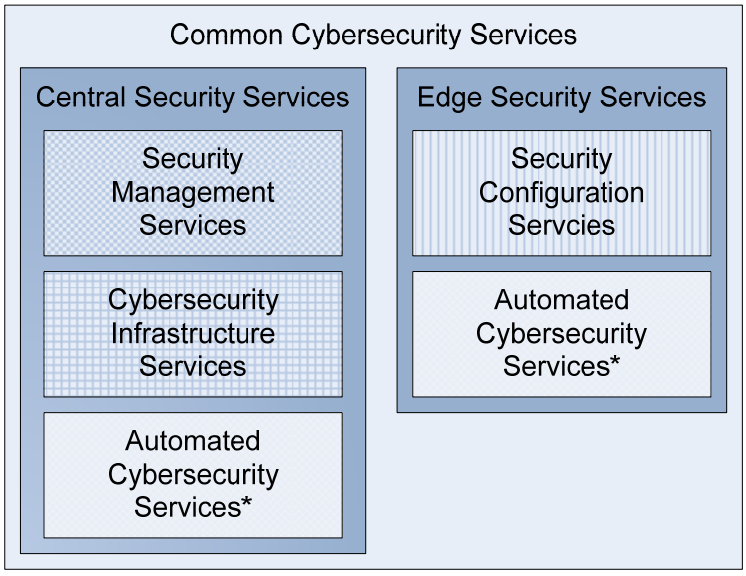
3. Standards Conclusion

SCE is a key leader in the industry in its development and support of interoperability standards. The strategic standards development effort is focused on enabling grid modernization while maximizing system reliability, safety and customer value. SCE believes that proper standards development and adoption will ultimately lead to minimized risk to full Smart Grid deployments.

E. Cybersecurity Overview

SCE has made significant progress on a foundational cybersecurity solution for the electric grid by developing Common Cybersecurity Services (CCS). SCE is actively engaged in technology transfer of advanced cybersecurity technologies from the defense and intelligence industry to the Smart Grid. CCS is designed to implement security mechanisms to enforce confidentiality, integrity and availability security services and policies that protect electronic information communication and control systems necessary for the management, operation, and protection of the SCE Smart Grid System of Systems (SoS). CCS is specifically designed to satisfy the requirements and standards developed by the SGIP CSWG workgroup and the impending NERC CIP Version 5 requirements.

The Common Cybersecurity Services is comprised of the Central Security Services (CCS) and Edge Security Services (ESS) depicted in the figure below.



*Common to both the Central and Edge Security Services

The Central Security Services consist of Security Management Services, Cybersecurity Infrastructure Services and Automated Security Services, which are physically located at the Grid Control Center. The Edge Security Services consists of Security Configuration Services and Automated Security Services, which provide distributed enforcement security at or near the perimeter of a system.

The CCS solution enables the design and enforcement of policies that can be configured for specific devices, device classes or locations in the electric grid. Each device on the electric grid secured by CCS will have a unique key to enable secure communications with its control system. This approach mitigates the risk that an attacker will be able to seize control of the electric grid from one end device and provides the flexibility to create virtual trust domains through the use of key groups to apply different levels of security and the ability to rapidly respond to a cybersecurity event.

SCE has worked with the defense and intelligence vendor community to invent the intellectual property, develop the software and deploy the CCS solution in our Advanced Technologies Smart Grid lab environment. We are currently working on CCS Edge Security Integration with key vendors of Smart Grid solutions and a production version of the CCS central services. We expect development of several form factors of our CCS Edge Services client as well as the Central Services to be completed by the end of 2012 and testing, implementation and demonstration of CCS on SCE's Irvine Smart Grid Demonstration project, Substation Automation v3 project, and the Tehachapi Wind Energy Storage project to be completed in 2013 with implementation of CCS on other Smart Grid related capital projects (such as C-RAS and Phasor) expected in 2014. Aside from deploying CCS on new capital projects, CCS also is designed to facilitate the participation of legacy equipment in our Smart Grid Architecture by deploying gateways and proxy devices at key points in the network to secure devices that cannot either technically or cost efficiently be upgraded to host a CCS client.

SCE is committed to working with the vendor community, federal and state agencies and standards bodies to ensure the CCS architecture and design are available to the utility industry.

1. Other Key Cybersecurity Initiatives

SCE's commitment to cybersecurity goes well beyond the development and implementation of CCS and includes a number of other cybersecurity initiatives to help secure the enterprise. For example, the Master Access List Project (MAP) will allow SCE to rapidly revoke and manage employee and contractor access to all electronic systems to reduce potential insider cybersecurity risks. Additionally, SCE has deployed a single sign-on and identity management capabilities to ensure role-based access controls are enforced across many of the applications in the enterprise and there is a historical record of access logs.

2. Cybersecurity Conclusion

SCE is a key leader in the industry in cybersecurity with transformational strategies, architectures and solutions that enable grid modernization. SCE's focus on risk assessment, standards, architecture and cost effective solutions provides value to its customers and helps to ensure a safe and reliable grid that is able to help support meeting the policy objectives of the state in the most cost efficient manner possible.

VI. Metrics Update

The metrics presented in this section quantitatively asses the progress in implementing Smart Grid-related policy goals in California, namely those enumerated in SB 17 (codified at Public Utilities Code Section 8360). These metrics, which were adopted by D.12-01-025, will provide the Commission with information to assist in the production of its annual report to the Legislature, as required under Public Utilities Code Section 8367. The adopted metrics are broken into four categories:

1. Customer/AMI Metrics;
2. Plug-In Electric Vehicles Metrics;
3. Storage Metrics; and
4. Grid Operations Metrics.

A. Customer Metrics/ AMI Metrics

1. Number of advanced meter malfunctions where customer electric service is disrupted, and the percentage this number represents of the total of installed advanced meters.

Metric - Meter Malfunctions	Total	Percent
Number of Advanced Meter Malfunctions Interrupting Customer Service	0	0

An Edison SmartConnect meter failure resulting in a disruption of customer electric service would occur if there was a malfunction in the integrated service switch. For the period of July 1, 2011 through June 30, 2012 there were no instances of an integrated service switch malfunction. In addition, there were no malfunctions resulting in a disruption of customer electric service due to meter tampering. This metric does not include malfunctions that do not result in service disruptions (e.g., usage measurement malfunctions).

2. Load impact in MW of peak load reduction from the summer peak and from winter peak due to smart grid-enabled, utility administered demand response (DR) programs (in total and by customer class).

Metric - Smart Grid Enabled DR	Customer Class	Load Impact Summer Peak (MW)	Load Impact Winter Peak (MW)
Load impact from smart-grid enabled, utility administered demand response programs	Residential	NA	NA
	C&I < 200 kW	NA	NA
	C&I > 200 kW	NA	NA
	Ag & Pumping	NA	NA
	Total	NA	NA

Program enrollments in available Edison SmartConnect-enabled programs began in 2011, and SCE expects load reduction from Edison SmartConnect-enabled programs to begin in the summer of 2012. The load impact data supplied by SCE only captures data for July 2011- September 2011 of the requested reporting period. The DR load impact protocols (D.08-04-050) directs SCE to file its load impacts annually by April 1. This requires SCE to have the reporting period end in September to provide sufficient time to calculate the impacts. To provide the load impacts using the adopted load impact protocols covering the remaining October 2011 - June 2012 period, SCE would need to conduct a separate analysis. Conducting such an analysis would only be necessary should there be DR events during the October-June timeframe. Typically DR events do not occur from October to June. Therefore, determining the costs could range from $0, for no events, to approximately $30,000 (per program) for ex post reporting should an event occur for a program. As such, SCE does find that conducting this additional analysis is warranted.

Note that in 2011, SCE administered Critical Peak Pricing, Demand Bidding Program, and Capacity Bidding Program for large C&I customers (above 200 kW) that resulted in a load impact of 108.9 MW. These programs utilize legacy interval meters and customers may view their interval usage data through SCE's EnergyManager programs. However, the legacy interval meters do not support HAN or event notifications; therefore, these programs are excluded from this metric.

3. Percentage of demand response enabled by AutoDR (Automated Demand Response) in each individual DR impact program.

Metric - % Auto DR	Price Responsive Program	Percent
Percentage of demand response enabled by AutoDR by individual DR impact program	CBP	5%
	CPP	11%
	DBP	17%

In 2010, SCE's demand response programs with AutoDR capabilities included the Capacity Bidding Program, Critical Peak Pricing, and the Demand Bidding Program. AutoDR load reductions from these programs were approximately 20 MW in 2011.

This table shows the AutoDR average estimated ex post load impacts relative to each program's aggregate ex post load impacts. Ex post load impacts were estimated from regression analysis of customer-level hourly load data according to the Demand Response Load Impact Protocols (D.08-04-050). These results reflect the demand reductions delivered during historical events, based on the conditions that were in effect during that time

4. The number and percentage of utility-owned advanced meters with consumer devices with Home Area Network (HAN) or comparable consumer energy monitoring or measurement devices registered with the utility (by customer class, CARE status, and climate zone).

Metric - HAN Registered Devices	Total	Percent
The number of utility-owned advanced meters with consumer devices with Home Area Network (HAN) or comparable consumer energy monitoring or measurement devices registered with the utility (by customer class, CARE, and climate zone, to extent available)	0	0

SCE launched a field trial in 2010 with 36 Edison SmartConnect customers. SCE utilized SEP 1.0 devices in order to develop SCE's understanding of future HAN operational needs. SCE expects full scale deployment of SEP 2.0 HAN technologies in 2014. Of the 36 customers participating in the field trial, 14 were CARE customers. In addition, SCE commenced two pilots in the fourth quarter of 2011 with 532 customers enrolled by June 29, 2012. The pilots are focused on, among other things, providing customers with near real-time usage data through HAN devices registered with Edison SmartConnect meters and obtaining customer feedback on HAN devices, enrollment processes, and behavioral changes resulting from information received through the HAN.

In future reports, this metric will only include devices that are registered with the utility's HAN. Devices that connected with a different gateway are excluded. Also, devices that are connected to an energy management system, but not registered with the utility, are excluded (even though the energy management system may be registered with the utility). SCE does not currently have the capability to track devices by CARE/non-CARE and climate zone.

Widespread adoption of consumer HAN devices have been postponed due to a delay in the adoption of the Smart Energy Profile 2.0 national standard and uncertainty regarding commercial availability. SCE expects this capability may become available in 2014. Thus, this metric will be relevant and reported as part of future Smart Grid Annual Reports.

5. Number and percentage of customers that are on a time-variant or dynamic pricing tariff (by type of tariff, by customer class, by CARE status, and by climate zone).

Time-of-Use Rates								
Customer Class	SCE Baseline Region[28]							
	06	08	09	10	14	15	16	Total
Residential (non-CARE)	310	457	98	1,182	78	25	27	2,177
EV	12	8	9	1	0	2	1	33
Residential (CARE)	86	208	25	550	73	0	11	953
C&I > 200 kW	278	376	602	538	281	20	189	2,284
C&I < 200 kW		1	1	5	2	1	0	10
Ag & Pumping	6	4	2	6	2	2	0	22
Total	692	1,054	737	2,282	436	50	228	5,479

Save Power Day Incentive (Peak Time Rebate Notifications)[29]								
Customer Class	SCE Baseline Region							
	06	08	09	10	14	15	16	Total
Residential (non-CARE)	1,629	8,040	6,585	25,978	869	0	296	43,397
Residential (CARE)	1,517	5,559	5,071	19,031	1,050	1	90	32,319
Total	3,146	13,599	11,656	45,009	1,919	1	386	75,716

This metric includes those customers who are on a time variant or dynamic pricing tariff and whose usage was measured by a program-ready Edison SmartConnect meter (i.e., customer billed based on collected interval usage data) as of December 31, 2011. SCE began billing customers on interval usage data in late 2010 and program enrollments for Edison SmartConnect-enabled programs and rates began in 2011. Customers enrolled in TOU-RTP and CPP as of this reporting period were using legacy interval data meters and were therefore excluded from this metric. To calculate the percentages, as of December 31, 2011, there were 1,535,584 customers with a program-ready Edison SmartConnect meter. Therefore, 0.4 percent of eligible customers were enrolled in a TOU rate, and 5 percent of eligible customers were enrolled in Save Power Day Incentive notifications.

[28] See Appendix 2 for a map of baseline regions.
[29] Note that Residential customers with an Edison SmartConnect meter are defaulted to the Save Power Day Incentive Program. This metric provides those customers who have elected to receive Save Power Day Incentive Program event notifications.

6. Number and percentage of escalated customer complaints related to (1) the accuracy, functioning, or installation of advanced meters or (2) the functioning of a utility-administered Home Area Network with registered consumer devices.

Metric - Customer Complaints	Complaint Type	Total	Percent
Number of escalated customer complaints related to (1) the accuracy, functioning, or installation of advanced meters or (2) the functioning of a utility-administered Home Area Network with registered consumer devices	Meter Accuracy	162	4%
	Meter Installation	22	0.5%
	Meter Functioning	236	5%
	HAN	0	0%

This metric identifies complaints received during the period July 1, 2011 through June 30, 2012 by SCE's Consumer Affairs department. To calculate the percentages, SCE received a total of 4,500 escalated complaints during the period July 1, 2011 through June 30, 2012. SCE defines the types of customer complaints measured by this metrics as follows:

Meter Accuracy – Escalated complaints to SCE's Consumer Affairs department related to high bills.

Meter Installation – Escalated complaints to SCE's Consumer Affairs department regarding SCE's Edison SmartConnect installation contractor (e.g., damaged property during meter installation).

Meter Functioning – Escalated complaints to SCE's Consumer Affairs department regarding issues such as radiofrequency/electromagnetic frequency, net energy metering reconciliation, and customer deployment opt-out requests.

7. The number and percentage of advanced meters replaced before the end of their expected useful life during the course of one year, reported annually, with an explanation for the replacement.

Metric - Meter Replacement	Total	Percent
Number of utility-owned advanced meters replaced annually before the end of their expected useful life	9,704	0.22%

This metric includes the number of Edison SmartConnect meters that were replaced during the Reporting Period. This meter failure rate is less than SCE's Edison SmartConnect business case assumption, as approved in D.08-09-039. The majority of Edison SmartConnect meters replaced before

the end of their expected useful life were due to problems with the meter's operating system, problems with the meter's Random Access Memory (RAM), and problems with the meter's display. As of June 30, 2012, SCE had installed 4,461,726 Edison SmartConnect meters

8. Number and percentage of advanced meters field tested at the request of customers pursuant to utility tariffs providing for such field tests, and the number of advanced meters tested measuring usage outside the Commission-mandated accuracy bands.

Metric - Meter Field Tests	Total	Percent
Number of advanced meter field tests performed at the request of customers pursuant to utility tariffs providing for such field tests	1,509	0.03%
Number of advanced meters tested measuring usage outside the Commission-mandated accuracy bands.	3	0.00%

This metric includes the number of field tests performed by SCE personnel on Edison SmartConnect meters at the customer's request pursuant to SCE's tariffs, and the number of Edison SmartConnect meters tested that measured usage outside of the Commission-mandated accuracy bands for the Reporting Period. As of June 30, 2012, SCE had installed 4,461,726 Edison SmartConnect meters.

9. Number and percentage of customers using a utility web-based portal to access energy usage information or to enroll in utility energy information programs or who have authorized the utility to provide a third-party with energy usage data.

Metric - Usage Info	Applicable Customer Class	Total	Percentage
Number and percentage of customers with advanced meters using a utility-administered internet or web-based portal to access energy usage information or to enroll in utility energy information programs	Unique Customers with Access to Interval Usage Data	1,156,968	40%
	Unique Customers that have Accessed their Interval Usage Data	232,199	8%
	Customers Enrolled in Budget Assistant	244,207	8%

This metric reports the number of customers that have enrolled in SCE's MyAccount and have access to their interval usage data through SCE's website, and the number of customers who accessed their interval usage data during the Reporting Period. In addition, this metric reports customers enrolled in SCE's Budget Assistant Program, which provides customers with automated proactive performance notifications based on a preset monthly spending goal. This metric excludes customers accessing usage information through non-utility portals, and also excludes customer accessing cumulative usage

information. SCE calculated the percentage based on the number of customers with a program-ready Edison SmartConnect meter. As of June 30, 2012, there were 2,916,206 customers with a program-ready Edison SmartConnect meter.

B. Plug-in Electric Vehicle Metrics

1. Number of customers enrolled in time-variant electric vehicles tariffs.

As described in its 2011 Smart Grid Deployment Plan, SCE supports four time-variant electric vehicle tariffs with the following enrollment numbers:

Metric - PEV Tariff Enrollment	Residential		Commercial	
Number of customers enrolled in time-variant electric vehicles tariffs *As of June 24, 2012	TOU-D-TEV	854	TOU-EV-3	16
	TOU-EV-1	140	TOU-EV-4	24

TOU-EV-3 and TOU-EV-4 are only available to commercial customers. This metric represents customer accounts which often charge many vehicles on a single dedicated meter (i.e., golf carts, electric trucking fleets, and electric forklifts). TOU-EV-4 is only available to customers above 20 kW and incorporates a demand charge while TOU-EV-3 does not.

C. Storage Metrics

1. MW and MWh per year of utility-owned or operated energy storage interconnected at the transmission or distribution system level. As measured at the storage device electricity output terminals.

Metric - Energy Storage	# of Facilities	Total MWs	Total MWhs/yr
MW and MWh per year of utility-owned or operated energy storage interconnected at the transmission or distribution system level. As measured at the storage device electricity output terminals	1	207 MWs	500 MWhs/yr

As of July 30, 2012, SCE's Eastwood power station – a pumped storage hydro facility located within the broader Big Creek complex – represents the only energy storage facility interconnected to either SCE's

transmission or distribution system. This pumped storage hydro facility has a capacity of approximately 207 MWs and produces about 500 MWh per year.[30]

D. Grid Operations Metrics

1. The system-wide total number of minutes per year of sustained outage per customer served as reflected by the System Average Interruption Duration Index (SAIDI), Major Events Included and Excluded for each year starting on July 1, 2011 through the latest year that this information is available.

Metric - SAIDI	Year	Major Events Included	Major Events Excluded
System-wide total number of minutes per year of sustained outage per customer served as reflected by SAIDI	2001	60.00	45.71
	2002	52.29	44.95
	2003	89.26	53.37
	2004	74.93	55.30
	2005	92.26	72.57
	2006	142.14	96.59
	2007	151.32	85.34
	2008	118.91	99.35
	2009	105.80	88.77
	2010	140.91	98.69
	2011	253.39	108.15

For the years 2006- 2011, SAIDI values were calculated per the guidance of IEEE 1366 with the exception of using five years of historical data. Pursuant to IEEE 1366, days are excluded from a given year's metric if their SAIDI exceeds 2.5 times the standard deviation of the natural logarithm of daily SAIDI over the previous five year period. However, complete ODRM data did not exist prior to 2006. Therefore, excludable days for years 2006 and 2007 were both determined based on daily SAIDI data in year 2006. Excludable days for 2008 were determined based on daily SAIDI data in years 2006 and 2007. Excludable days for 2009 were determined based on daily SAIDI data in years 2006, 2007, and 2008. Excludable days for 2010 were determined based on daily SAIDI data in years 2006, 2007, 2008, and 2009. This interim approach is consistent with IEEE 1366.

Consistent with SCE's 2011 Annual System Reliability Report, the reported SAIDI metrics data utilizes a definition of "sustained" interruption as described in IEEE Standard 1366, 2003 Edition, which is an interruption lasting longer than five minutes. Furthermore, as indicated within SCE's 2011 Annual System Reliability Report, the 2011 windstorm in Los Angeles County occurring on November 30 and December 1, 2011 resulted in daily levels of SAIDI significantly greater than any seen in the past ten years. SCE intends to file, in the near future, an advice letter informing the Commission of its intent and schedule for fully transitioning from the calculation methods of D. 96-09-045 to those of IEEE 1366.

[30] The annual energy production of SCE's pumped hydro facility varies from year to year depending on hydrological reserves and resource dispatch requirements.

2. How often the system-wide average customer was interrupted in the reporting year as reflected by the System Average Interruption Frequency Index (SAIFI), Major Events Included and Excluded for each year starting on July 1, 2011 through the latest year that this information is available.

Metric - SAIFI	Year	Major Events Included	Major Events Excluded
How often system-wide average customer interrupted in reporting year as reflected by SAIFI	2001	1.19	0.97
	2002	1.27	1.05
	2003	1.39	1.11
	2004	1.34	1.15
	2005	1.53	1.33
	2006	1.05	0.89
	2007	1.10	0.88
	2008	1.06	0.95
	2009	0.90	0.83
	2010	1.05	0.82
	2011	1.04	0.91

For the years 2006- 2011, SAIFI values were calculated per the guidance of IEEE 1366 with the exception of using five years of historical data. Pursuant to IEEE 1366, days are excluded from a given year's metric if their SAIDI exceeds 2.5 times the standard deviation of the natural logarithm of daily SAIDI over the previous five year period. However, complete ODRM data did not exist prior to 2006. Therefore, excludable days for years 2006 and 2007 were both determined based on daily SAIDI data in year 2006. Excludable days for 2008 were determined based on daily SAIDI data in years 2006 and 2007. Excludable days for 2009 were determined based on daily SAIDI data in years 2006, 2007, and 2008. Excludable days for 2010 were determined based on daily SAIDI data in years 2006, 2007, 2008, and 2009. This interim approach is consistent with IEEE 1366.

Consistent with SCE's 2011 Annual System Reliability Report, the reported SAIDI metrics data utilizes a definition of "sustained" interruption as described in IEEE Standard 1366, 2003 Edition, which is an interruption lasting longer than five minutes. SCE intends to file, in the near future, an advice letter informing the Commission of its intent and schedule for fully transitioning from the calculation methods of D. 96-09-045 to those of IEEE 1366.

3. The number of momentary outages per customer system-wide per year as reflected by the Momentary Average Interruption Frequency Index (MAIFI), Major Events Included and Excluded for each year starting on July 1, 2011 through the latest year that this information is available.

Metric - MAIFI	Year	Major Events Included	Major Events Excluded
Number of momentary outages per customer system-wide per year, as reflected by MAIFI, major events included and excluded	2001	1.16	1.08
	2002	1.15	1.09
	2003	1.43	1.15
	2004	1.21	1.05
	2005	1.47	1.23
	2006	1.85	1.52
	2007	1.74	1.37
	2008	1.73	1.56
	2009	1.45	1.31
	2010	1.69	1.41
	2011	1.53	1.36

For the years 2006- 2011, MAIFI values were calculated per the guidance of IEEE 1366 with the exception of using five years of historical data. Pursuant to IEEE 1366, days are excluded from a given year's metric if their SAIDI exceeds 2.5 times the standard deviation of the natural logarithm of daily SAIDI over the previous five year period. However, complete ODRM data did not exist prior to 2006. Therefore, excludable days for years 2006 and 2007 were both determined based on daily SAIDI data in year 2006. Excludable days for 2008 were determined based on daily SAIDI data in years 2006 and 2007. Excludable days for 2009 were determined based on daily SAIDI data in years 2006, 2007, and 2008. Excludable days for 2010 were determined based on daily SAIDI data in years 2006, 2007, 2008, and 2009. This interim approach is consistent with IEEE 1366.

Consistent with SCE's 2011 Annual System Reliability Report, the reported SAIDI metrics data utilizes a definition of "sustained" interruption as described in IEEE Standard 1366, 2003 Edition, which is an interruption lasting longer than five minutes. SCE intends to file, in the near future, an advice letter informing the Commission of its intent and schedule for fully transitioning from the calculation methods of D. 96-09-045 to those of IEEE 1366.

4. Number and percentage of customers per year and circuits per year experiencing greater than 12 sustained outages for each year starting on July 1, 2011 through the latest year that this information is available.

Metric	Year	Customers/yr	Circuits/yr
Number of customers per year and circuits per year, experiencing greater than 12 sustained outages	2001	2,605	9
	2002	1,896	4
	2003	7,212	19
	2004	12,269	26
	2005	3,123	13
	2006	93	2
	2007	741	3
	2008	1,473	16
	2009	435	8
	2010	167	5
	2011	1,243	7

The number of customer and circuits per year experiencing greater than 12 sustained outages can be attributed to a number of natural and man-made causes. In 2010, SCE reported that eight out of the ten longest sustained outages were caused by contact with vegetation, wind, lightning, or fire and two of the ten longest outages were caused by overloaded circuit conditions. In 2011, nine out of ten longest sustained outages were caused by contact with vegetation, wind, lightning, or snow. One of the ten longest outages was caused by unknown reasons and or conditions.

5. System load factor and load factor by customer class for each year starting on July 1, 2011 through the latest year that this information is available.

Metric - Load Factor	Customer Class	2010 Load Factor
System load factor and load factor by customer class	Residential	34%
	C&I < 200 kW	47%
	C&I > 200 kW	66%
	Ag & Pumping	56%
	System	50%

Load factor is defined as the average load throughout a given year divided by the peak load during that same year. This value can be calculated for an entire system or a specific customer class and is typically used as a measure of how effectively generation capacity is used. SCE calculates system load factor and load factor by customer class ever year as part of its annual rate group load studies, which are leveraged for analyses in the Phase II (Rate Design) of the GRC. This process leverages statistically valid load data from over 5,000 customers, representing all classes of Edison customer, with each sampled customer

exceeding 35,000 data points[31]. Load factors by customer class often reside outside of the system wide range because of their differing load profiles, or energy consumption patterns.

6. Number of and total nameplate capacity of customer-owned or operated, grid-connected distributed generation facilities.

Metric - DG Number & Capacity	Program	# of Facilities	Total Capacity (MW)
Number of and total nameplate capacity of customer-owned or operated, utility grid-connected distributed generation facilities - Reporting Start Date: July 2011	CREST (FIT)	7	8
	RAM (FIT)	0.0	0.0
	UOG SPVP	22	52.5
	CSI	10,375	129.9
	SGIP	22	11.8
	TOTAL	**10,426**	**202.2**

SCE offers two state-mandated incentive programs, the California Solar Initiative (CSI) and the Self-Generation Incentive Program (SGIP), for customer side of the meter DG, also referred to as "onsite generation" or "self-generation". The CSI is the leading contributor to both the total number and capacity of customer-owned or operated DG facilities within SCE's service territory with just over ten million systems installed with a capacity of about 130 MW.

SCE also supports programs and policies related to procurement of utility-side of the meter DG, also called "wholesale" or "system-side generation" because it is intended to net export onto the electrical system on the other side of the customer meter or connect to the distribution system directly. The California Renewable Energy Small Tariff (CREST) is a renewable feed-in-tariff that provides a standard power purchase agreement whereby SCE pays for either the total or excess energy a customer generates from renewable facilities not greater than 1.5 MW. This program accommodates all renewable technologies up to 247.7MW, which is SCE's share of the 500 MW state capacity cap. SCE's Solar Photovoltaic Program (SPVP) allows SCE, over a five year period, to build and operate 125 MWs of utility-owned solar photovoltaic capacity and to execute contracts up to 125 MW for generation from similar facilities owned and maintained by independent power producers (IPPs) through a competitive solicitation process. This program is applicable to primarily rooftop solar PV facilities with a small portion of ground mounted facilities. During the Reporting Period, the SPVP brought online 22 facilities with a collective capacity of about 53 MW.

In addition, SCE administers its Renewable Auction Mechanism (RAM) program. This is a competitive procurement process for utility purchases from independent power producers of electricity generated from eligible renewable facilities up to 20 MW per project. SCE has been allocated 723.4 MW in the RAM program.

[31] See http://asset.sce.com/Regulatory/SCE%20Load%20Profiles/hist_met.pdf for details on the method used within SCE's annual rate group load studies.

7. Total electricity deliveries from customer-owned or operated, grid-connected distributed generation facilities, reported by month and by ISO sub-Load Aggregation Point.

Metric - DG Electric Deliveries	Program	kWhs
Total annual electricity deliveries from customer-owned or operated, utility grid-connected DG facilities	CREST (FIT)	5,681,811.30
	RAM (FIT)	0
	SPVP (FIT)	84,158,074
	NSC	7,930,005
	TOTAL	**97,769,890.30**

Facilities brought online under SCE's CREST, SPVP, and net surplus compensation (NSC) programs together produced over 97 million kWh. This value captures only electric deliveries to the grid; it does not represent the total energy production of distributed generators in SCE's service territory. All of the energy provided by distributed generators in either the CSI or SGIP programs is "customer side of the meter", meaning that it first serves onsite customer load requirements before feeding any excess energy onto the distribution system. Customers matching this load profile have the option to subscribe under SCE's NSC rate, which pays customers who produce more kilowatt hours than they consume in a 12-month period.

8. Number and percentage of distribution circuits equipped with automation or remote control equipment, including Supervisory Control and Data Acquisition (SCADA) systems.

Metric - Circuit Automation	# of Automated Circuits	Total Circuits	% Automated
Number and percentage of distribution circuits equipped with automation or control equipment, including Supervisory Control and Data Acquisition (SCADA) systems - Reporting Start Date - July 2011	2,290	4,503	51%

As of July 1, 2012, SCE had a total of 4,503 distribution circuits in operation – 2,290 of which are automated with mid and/or tie remote control switches. This metric indicates that 51 percent of circuits can be remotely monitored and controlled through SCE's existing DMS system to protect critical distribution equipment, restore outages, and minimize customer minutes interrupted.

Appendix 1

Smart Grid Customer Engagement by Initiative

Smart Grid Engagement by Initiative. As requested by CPUC staff in its March 1, 2012 Smart Grid Workshop Report, the information presented in this appendix provides the customer engagement elements (i.e., project description, target audience, sample message, source of message, current road blocks and strategies to overcome roadblocks) for the following initiatives:

Customer Premise Devices

A. Smart Meters

B. Summer Discount Plan (PCT)

C. Near Real-Time Usage (HAN)

Online Tools

D. Integrated Audit Tool

E. Web Presentment Tools

F. Budget Assistant

G. Green Button

H. Energy Service Provider Interface

I. Mobile Outage Application

Rates and Programs

J. Save Power Day (PTR)

K. Dynamic Pricing and TOU Rates

L. PEV Time-of-Use Rates

Customer Premise Devices

A. Smart Meters

Project Description	ME&O to help customers better understand the purpose of the new smart meter, how it will benefit them, and provide answers to common questions. See A.07-07-026, as authorized by D.08-09.039, for more information about SCE's smart meter deployment.
Target Audience	Residential and small/medium non-residential customers with demands less than 200 kW.
Sample Message	"You will be receiving a new Edison SmartConnect meter. This new digital meter will enable you to access online tools and services that give you the power to easily track your energy costs and save."
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Customers may have health and privacy concerns about smart meters. • Customer may want to opt out of receiving a new meter.
Strategy to Overcome Roadblocks	The strategies outlined below are consistent with SCE's Opt-Out Phase 1 decision (D.12-04-018), and with SCE's Opt-Out Procedures provided in Advice Letter 2726-E: • Allow customers to opt-out of receiving the smart meter. • Inform residential customers that the Opt-Out Program is available using communication methods that include: o Information on SCE's external website (www.sce.com). o References to the Opt-Out Program in standard Edison SmartConnect installation letters in areas where meter deployment is still underway. o SCE sent a letter using Certified Mail or equivalent service that provides program information, including enrollment procedures to any customer who requested that SCE add them to the Delay List. o Address common customer questions online and in communication materials sent to customer. o Provide information in multiple languages. o Use variety of channels to reach customers with access issues (i.e., door hangers, letters, and outbound calling).

B. Summer Discount Plan (with PCT enabling technology)

Project Description	ME&O to educate and enroll customers in SCE's Summer Discount Plan (SDP) program which transitioned from a reliability program to a price responsive program. In 2013, ME&O efforts will begin to support the utilization of programmable communicating thermostat (PCT) enabling technology (in addition to compressor switches) for residential customers on a limited basis. In 2012, ME&O efforts educated existing SDP customers on program changes (due to the transition to a price responsive program) and enrolled Orange County customers as part of SCE's 2012 Summer Readiness effort. In 2013, ME&O will be provided to educate and enroll a limited number of customers in SDP with PCT enabling technology. See D.11-1-002 (A.10-06-017) and D.12-04-045 (A11-03-001) for more information about the SDP program.
Target Audience	In 2012, residential customers who are enrolled in SDP, and residential customers with central air conditioning in Orange County and who are not enrolled in SDP. In 2013, residential customers with central air conditioning who are not enrolled in SDP.
Sample Message	In 2012, communications discussed program changes around the transition, such as, "While we've made some changes to the program, you'll still enjoy great savings while helping the environment too." Communications also included "additional energy events due to high energy price levels" and the communication of "override options". SCE expects to develop marketing messages for SDP with PCT enabling technology in late 2012, as SDP with PCT enabling technology is not expected to be available until 2013.
Source of Message	Utility
Current Customer Engagement Road Block(s)	Road blocks to customer engagement will be identified in late 2012 as part of the marketing plan development, as SDP with PCT enabling technology is not expected to be available until 2013 for a limited number of customers.
Strategy to Overcome	Strategies to overcome customer engagement road blocks will be identified in late 2012 as part of the marketing plan development, as SDP with PCT enabling technology is not expected to be available

Roadblocks	until 2013.

C. Near Real-Time Usage (HAN)

Project Description	ME&O to educate customers regarding near real-time usage data which will provide a customer's current usage provided on an approximately 12-second delay.
Target Audience	Residential and small/medium non-residential customers with demands less than 200 kW
Sample Message	SCE has not yet developed sample messaging for this service.[32] In SCE's Smart Meter HAN Implementation Plan (AL-2662-E, November 29, 2011), SCE indicated that this service will not be widely available until the 2014 to 2015 timeframe.[33]
Source of Message	Utility and third parties that leverage the data for energy service offerings
Current Customer Engagement Road Block(s)	Road blocks to customer engagement will be identified as part of the marketing plan development. Road blocks may include customer confusion on where to obtain devices and which devices are compatible with SCE's meter.
Strategy to Overcome Roadblocks	Strategies to overcome road blocks will be identified as part of the marketing plan development and feedback from customers. Potential strategies to overcome roadblocks may include certain Commission requirements, such as listing devices that have passed compatibility testing, and communicating which smart grid standards customers should look for in a device.

[32] On a limited basis, SCE has provided customers on its Edison SmartConnect Field Trials education regarding device set-up, registration, and capabilities.

[33] On August 9, 2012, the Energy Division issued Draft Resolution E-4527 which has not been adopted by the Commission. This Draft Resolution directed SCE "to provide basic education to customers about the HAN function available with their electric smart meters…" SCE will provide HAN related education consistent with a Commission resolution on this matter. In addition, as provided in SCE's Smart Meter HAN Deployment Plan in AL-2662-E, SCE will provide certain HAN deployments at the customer's option. Such deployments are the subject of Energy Division's Draft Resolution E-4527.

Online Tools

D. Integrated Audit Tool

Project Description	ME&O to generate participation in SCE's online integrated audit tool, Home Energy Advisor (for residential customers) and the Business Energy Advisor (for business customers). Upon completion of an integrated survey (audit), customers will receive customized DSM recommendations that will help customers better manage their energy usage.
Target Audience	Residential and small business customers
Sample Message	Answer some questions to get an analysis of your energy use, along with customized recommendations for how to save and where to start. Then, let the tool work for you by tracking your progress, updating your actions and seeing the savings.
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Only available online • Customers who previously took the online Home Energy Efficiency Survey may not see the benefit of using this new tool
Strategy to Overcome Roadblocks	• Developing a mail component for the integrated audit. • Emphasizing the benefits of the new tool in marketing materials.

E. Web Presentment Tools

Project Description	ME&O to educate customers about online tools that provide interval energy usage and billing data that enable customers to make better energy management decisions. Online tools include: estimated bill-to-date, projected next bill, and interval data charts. See SCE Advice 2693-E[34] for more information about this tool.
Target Audience	Residential and small/medium non-residential customers with demands less than 200 kW who have a smart meter that is measuring interval data for billing purposes.
Sample Message	"Online tools can help you take control of your energy bills."
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Customers need internet access to take full advantage of the tools. • Lack of awareness of these new tools.
Strategy to Overcome Roadblocks	• Customers who do not have internet access can obtain information on their interval energy usage and billing data through the call center. • Bundle tools with other relevant products, rates and services, such as TOU rates. • Integrate relevant information into appropriate marketing materials.

[34] Advice 2693-E is pending disposition from the Commission.

F. Budget Assistant

Project Description	ME&O to educate customers regarding SCE's Budget Assistant tool which allows customers to easily monitor energy usage and costs. ME&O will educate, inform and enroll customers by communicating that Budget Assistant helps eliminate end of the month bill surprises by providing alert notifications. See SCE Advice 2693-E[35] for more information about this tool.
Target Audience	Most residential and small/medium non-residential customers with demands less than 200 kW, including customers enrolled in the following schedules: D, D-CARE, D-FERA, TOU-D-T, GS-1, and GS-2.
Sample Message	"Manage and control your electricity costs when you set a monthly spending goal and get updated with weekly email, text or voice message alerts – eliminating any end-of-the-month bill surprises."
Source of Message	Utility
Current Customer Engagement Road Block(s)	Customers must enroll in the program to receive alerts.
Strategy to Overcome Roadblocks	Simplify enrollment process by providing multiple response channels, including: online, mail, and phone (inbound and outbound).

[35] Advice 2693-E is pending disposition from the Commission.

G. Green Button

Project Description	Green Button is a White House initiative to allow customers greater access to their usage data via a "Green Button" on sce.com. Green Button will allow customers to download up to thirteen months of historical interval usage data in a data format that is standard across utilities.
Target Audience	Residential and small/medium non-residential customers with demands less than 200 kW
Sample Message	Green Button icon and "Download My Data" message provided on SCE.com.
Source of Message	Pending CPUC approval, the messaging source is expected to be third parties that leverage Green Button data for their energy service offerings.
Current Customer Engagement Road Block(s)	SCE will provide the Green Button data, but does not market or offer any services that will use the Green Button data beyond providing the Green Button icon and "Download My Data" messaging on SCE.com
Strategy to Overcome Roadblocks	Third parties, CPUC, and IOUs should monitor national Green Button developments, continue discussions with the U.S. Department of Energy, and respond as appropriate.

H. Energy Service Provider Interface (ESPI)

Project Description	ME&O to provide third parties access to individual customer's smart meter usage data via the utility's "backhaul" when authorized by the customer, and in a common data format consistent with the ongoing national Smart Grid standards efforts. See A.12-03-004 for more information about SCE's proposed effort.
Target Audience	Upon initial deployment, ESPI will be for residential and small/medium non-residential customers with demands less than 200 kW. The ESPI platform will be available for large non-residential customers soon after (the specific date is to be determined)
Sample Message	SCE will provide customer usage data to authorized third parties. These third parties will market such services to residential and small business customers, and will develop messaging consistent with their energy service offerings.
Source of Message	Third parties that leverage ESPI for their energy service offerings.
Current Customer Engagement Road Block(s)	Third parties will provide this service to customers. This service is not expected to be available until twelve months after the Commission issues a final decision on SCE's Application for Approval of Proposal to Enable Automated Access of Customer Usage Data to Authorized Third Parties and Approval of Cost Recovery Mechanism (A.12-03-004). Thus, at this time, the majority of the roadblocks relate to the lack of clarity around processes, timing, tariff rules and other aspects.
Strategy to Overcome Roadblocks	SCE has urged the Commission to issue a Proposed Decision on A.12-03-004 as soon as possible, preferably by the end of the third quarter of 2012. This will help to clarify some of the unknown aspects of the ESPI deployments and enable SCE to begin developing its platform.

I. Mobile Outage Application

Project Description	ME&O to educate customers on a new mobile application that customers can download to their smart phones for free. This application reports outage status and allows customers to report outages. See SCE.com for more information about this application.
Target Audience	Customers who use a smart phone
Sample Message	"SCE has a new power outage app you can download and install for your Android phone or iPhone. If you experience a power outage or see a downed power line, use the app via your phone's web connection to contact SCE and report the issue. You can also use the app to view a map of outage locations, and find out when your service may be restored."
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Customer must have a smart phone to access the application. • Lack of customer awareness of this new tool.
Strategy to Overcome Roadblocks	• Customers without a smart phone can continue to call or go online to report an outage. • Integrate educational materials regarding this new tool in appropriate marketing materials and sce.com.

Rates and Programs

J. Save Power Day (Peak Time Rebate)

Project Description	ME&O to educate customers on the Save Power Day (SPD) program and alerts, including the Save Power Day Incentive Plus (Peak Time Rebate with Enabling Technology) program. Customers do not need to enroll to receive incentives, however, they must enroll in SPD Incentive Alerts (phone, text, or email alerts) to receive a notification when a SPD event will be called. ME&O will educate customers about SPD Incentive Plus which provides a $1.25/kWh rebate for those who enroll and have a registered HAN device (SPD rebates for customers without a registered HAN device is $0.75/kWh). Event notifications are sent to the HAN device in a text message. See sce.com for more information about the SPD program.
Target Audience	Residential customers with a smart meter that is measuring interval data for billing purposes.
Sample Message	"Sign up for an Alert and receive advanced notification of a Save Power Day event." Messaging for SPD with Enabling Technology is in development.
Source of Message	Utility
Current Customer Engagement Road Block(s)	• Customer confusion regarding the differences between Save Power Day events and statewide Flex Alerts. • Lack of awareness and understanding regarding what Save Power Day events and/or alerts represent. • Customers (not enrolled in My Account) need to sign up to receive an alert. • Customers must have a registered HAN device to participate in Save Power Day Incentive Plus.
Strategy to Overcome Roadblocks	• Continue communications to generate awareness and understanding. • Continue communications to help customers recognize and understand the difference between a Save Power Day and

	Flex Alert. • Create communication to help customers understand the impact Save Power Day event s have to their Demand Response program • Customers on who sign up for My Account are automatically signed up to receive SPD alerts. • Listing SPD Incentive Plus as an available program for enrollment within the HAN device self-registration SCE.com webpages

K. Mandatory / Default Dynamic Pricing and Time-of-Use Rates

Project Description	ME&O campaign will introduce small business customers to mandatory TOU rates and dynamic pricing, including default Summer Advantage Incentive (i.e., Critical Peak Pricing (CPP)).
Target Audience	Small/medium business customers with demands less than 200 kW.
Sample Message	"Shifting your electricity usage from peak periods gives you a chance to lower your annual energy costs, without reducing the overall amount of electricity you use. "With TOU rate options, your cost varies based on when you use electricity or the Summer Advantage Incentive (i.e., CPP) may be beneficial to you, if you can shift usage to off-peak times during Demand Response program events."
Source of Message	Utility
Current Customer Engagement Road Block(s)	Lack of customer awareness and understanding of time-variant and dynamic pricing rates.
Strategy to Overcome Roadblocks	• Integrate message into relevant marketing efforts. • Use multiple channels and languages to reach customers. • Promote energy information tools available online that provide interval energy data to help customers better understand and manage their energy usage. • Implement online rate analysis tool to assist customers in making decisions on rate options. • Provide a pro-active bill impact and rate analysis to all affected customers being moved to mandatory time-of-use rates to encourage use of the self-service tools and increase customer engagement with making well informed decisions.

L. PEV Time-of-Use Rates

Project Description	ME&O to educate customers on PEV rate options, environmental benefits, charging levels, and other aspects of PEVs. Materials encourage customers to contact the utility prior to taking delivery of a PEV which will better inform the customer and start the process for SCE to check the distribution infrastructure for safe and reliable charging. See SCE.com for more information about PEV TOU rates.
Target Audience	Customers who have notified SCE of their interest in purchasing a PEV, customers who have notified SCE of their interest in providing a charging station(s) (i.e., fleet, workplace, commercial and multifamily dwelling charging), auto dealers, manufacturers, electricians, and installers.
Sample Message	"Charge smart with SCE's rates (TOU), tools and resources. SCE can help make charging your new PEV simple, safe and economical." BEVs and PHEVs travelling on electricity produce essentially no air pollution, even considering power plant emissions. These vehicles contribute to a cleaner, greener commute and lower your personal carbon footprint due to reduced greenhouse gas emissions.
Source of Message	Utility and third parties
Current Customer Engagement Road Block(s)	• Customers do not think about contacting the utility prior to purchasing and/or taking delivery of their new PEV. • Dealers have some apprehension to introducing the role of the utility during the sales process.
Strategy to Overcome Roadblocks	• Conduct online advertising to generate awareness of the role of the utility and PEVs. • Utilities to perform education and outreach activities to PEV dealers.

Pilot and Demonstration Programs. In addition to the initiatives described above, SCE has launched or will commence various Customer Empowerment pilots and demonstration projects. Generally, SCE will provide these pilots to a limited target audience for a limited duration and SCE will not provide ME&O to its general customer population. However, these efforts are expected to provide SCE with an improved assessment of potential messaging, customer engagement roadblocks, and potential strategies to overcome such roadblocks. Information regarding specific SCE Customer Empowerment efforts is provided below:

- **Irvine Smart Grid Demonstration (ISGD).** The objective of SCE's ISGD project is to verify, quantify, and validate the feasibility of integrating Smart Grid technologies. This project will deploy various technologies that represent the future of an integrated electric distribution system that is expected to be more reliable, secure, economic, efficient, safe, and environmentally friendly than those in general use today. The project will showcase advanced technologies necessary to support the smarter, more robust electricity infrastructure that will be critical as the country begins to rely on greater amounts of renewable generation, to use electricity as a fuel for vehicles, and recruit consumers to become active participants in the energy supply chain. To accomplish these objectives, ISGD encompasses four key areas addressing a broad set of requirements: (1) energy smart customer devices, (2) year 2020 distribution system, (3) secure energy network, (4) workforce of the future.

- **Edison SmartConnect Field Trials – Interim HAN Solution.** The purpose of this effort is to implement back office processes and system functionality to enable customer HAN device registration over SCE's AMI network. Participation in this effort was limited to 500 eligible residential Edison SmartConnect program ready customers in 2012. Participating customers received a free IHD device which received near real-time energy information, daily cost/price HAN text messages, and Save Power Day Incentive Plus event notifications. ME&O is provided by the utility. SCE is providing this service on a pilot basis in 2012, and this service is not expected to be widely available until 2014. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after this effort is complete. This effort is part of the Edison SmartConnect Field Trials.

- **Edison SmartConnect Field Trials – HAN Third Party Limited Launch.** The purpose of this effort is to promote HAN-enabled energy information displays and SCE's Save Power Days Program through retail and service providers to residential customers. SCE and third party retailers will focus their on ease-of-use and bill savings, and will be provided by SCE and the third parties. This pilot is expected to be launched in the fourth quarter of 2012 and will likely continue into the first quarter of 2013. Customer engagement roadblocks and strategies to overcome roadblocks will be evaluated after the pilot program is complete. This effort is part of the Edison SmartConnect Field Trials.

- **Edison SmartConnect Field Trials – HAN Real-Time Cost Pilot.** The purpose of this pilot is to provide near-real time cost information in a "dollars-per-hour" format, and to qualitatively

assess behavioral impacts of residential customers. The messaging will be provided by the utility. This service will be provided on a pilot basis in 2012, and is not expected to be widely available until 2014. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete. This effort is part of the Edison SmartConnect Field Trials.

- **Edison SmartConnect Field Trials – HAN with Load Control.** The purpose of this pilot is to evaluate the technology and processes before offering this potion to SCE's residential customers. See Section III for more information. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

- **Edison SmartConnect Field Trials – Long Beach Field Trial.** The purpose of this pilot is to evaluate customer interaction with two different IHD devices. See Section III for more information. Customer education was provided by SCE. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

- **Home Battery Pilot.** The Home Battery Pilot will provide residential energy storage units (RESUs) in a limited number of customer locations to assess the technology's performance. See Section III for more information. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

- **Smart Charging PEV Pilot.** The purpose of this pilot is to evaluate PEV DSM programs that target overall system demands along with programs that target local distribution infrastructure such as transformers and service entrances. See Section III for more information. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

- **Work Place Charging PEV Pilot.** The Work Place Charging PEV Pilot will test, monitor, and analyze the impacts of PEV workplace charging at SCE facilities. See Section III for more information. Potential messaging, customer engagement roadblocks, and strategies to overcome roadblocks will be evaluated after the pilot program is complete.

Conceptual Projects. In its Deployment Plan, SCE identified certain conceptual projects. These projects include ALCS Release 3, PEV Metrology, Subtractive Billing, and On-Going Customer System Enhancements. As these projects are conceptual in nature, SCE has not yet developed any ME&O plans (e.g., target audience, sample messages, source of message, strategies to overcome roadblocks). SCE will reevaluate its ME&O approach (if any) once the projects advance from the conceptual stage.

Infrastructure Projects. Certain projects identified in SCE's Customer Empowerment Baseline and Roadmap Summary provide the necessary supporting infrastructure which enables SCE's Smart Grid enabled DSM programs and services. Generally, these projects are not customer facing and, as such,

SCE does not expect to provide specific ME&O to support these efforts. Such efforts include Load Control System Enhancements, PEV Metering Capital Requirements (2nd Meter for PEV), Dynamic Pricing System, Alerts and Notifications System, PEV Support Systems, DR System Enhancements, and HAN Support Systems.

Appendix 2

Description of Baseline Regions

Map of Baseline Regions